THE IRON TRADE REVIEW

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Greatest Production in History of the Country

Will Probably Be Recorded By October—Pig Iron Prices Advancing—Heavy Order for Steel for Car Building

The production of steel ingots and pig iron in October will probably amount to the largest tonnage in the history of the country. The Steel Corporation will make fully 1,500,000 tons of steel and the production of the independent companies will represent about the same tonnage. Iron ore shipments are also making new records, as September was the fourth month in which more than 7,000,000 tons of ore were shipped from the Lake Superior mines and it is expected that this month will show shipments greater than any other October in the history of the lake traffic. The tremendous production of pig iron, steel and finished products is being absorbed by the country without difficulty. Pig iron stocks in the central west continue to decline at the rate of 25,000 tons per month, and in other parts of the country, there is a proportionate reduction in stocks. The labor shortage continues to be embarrassing and the outlook is for even more unfavorable conditions. The war between Turkey and the Balkan states may attract large numbers of volunteers from this country. Some have already enlisted. Complaints of car shortage are heard more frequently.

Pig Iron

Although the buying of pig iron has not been as heavy in all parts of the country as it was a week or two ago, prices are still tending upward and some sharp advances have been made. In the Pittsburgh, valley and lake districts, sales have been made at considerably higher prices and activity continues unabated. The Cambria Steel Co. purchased 25,000 tons of Bessemer at $17, valley, for shipment through the first quarter of next year. The demand for Bessemer continues strong in the Pittsburgh district. A Kentucky buyer purchased from 15,000 to 20,000 tons of basic. Another buyer took 15,000 tons of basic, at $16.25, valley. There is very little, if any, basic, foundry and malleable iron available at less than $16.25, valley. A sanitary company has purchased about 15,000 tons of foundry grades, for the greater part of which it paid $16, valley. Some sales of foundry iron have been made as high as $16.50, valley. Sales in eastern territory include 10,000 tons of No. 2X to a manufacturer of radiators, placed in the Buffalo district, for shipment to Connecticut, and a round tonnage of No. 2X for first half delivery at Uniontown, Pa., to the same buyer. Another Connecticut buyer took 8,000 tons of No. 1 foundry for first half, and a New Jersey stove maker 5,500 tons of No. 2X. The American Radiator Co. has made additional purchases aggregating 15,000 tons. The International Steam Pump Co. officially announces that its recent purchases of pig iron for delivery next year amount to 50,000 tons. Demand for foundry, forge and low phosphorus pig iron continues active in the eastern Pennsylvania district and there are shortages in some grades.

Selling Policy

Although predictions of higher quotations on shapes, plates and bars have been more freely made during the past week, there has been no general movement upward, although independent companies are in some cases asking higher prices. All companies are conservative in taking business and frequently buyers find that they are not able to place orders for more than half of their requirements.

Shapes

The placing of the contract by Corrigan, McKinney & Co. for the erection of the finishing mills of their new plant at Cleveland is the latest indication of the growing importance of that city as a steel manufacturing center. The buildings will be erected by the American Bridge Co. The contract for the high level bridge across the Cuyahoga river, at Cleveland, involving about 4,000 tons, will probably be awarded to the King Bridge Co., which is the lowest bidder.

Railroad Buying

The American Car & Foundry Co. has ordered 100,000 tons of plates, shapes and bars to cover requirements for car construction. The early rail order of the Pennsylvania system calls for about 135,000 tons, half of which will be rolled by April 1, and half by May 1. Later orders will bring the tonnage to probably 250,000. The Erie railroad has placed 25,000 tons of rails for next year with the Carnegie Steel Co. The Wisconsin Bridge Co. has taken 2,700 tons of shapes for bridges on the Great Northern.

Coke and Old Material

The coke market has been much excited during the past few days. The supply is not equal to the demand and labor shortage makes it impossible to increase the production to any great extent. It is extremely difficult to get any prompt furnace coke at less than $3, and $3.25 at the ovens has been paid for tonnages of considerable size. The old material market in the Pittsburgh district has also been excited.

PITTSBURGH

Pig Prices Climbing---Scrap Market Excited

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., Oct. 8.

Demand for all grades of finished iron and steel products continues heavy, and many manufacturers in this district already have booked sufficient tonnage to necessitate mills operating at capacity well into second quarter. Leading manufacturers are exercising all possible effort to prevent further advances in prices, but notwithstanding this conservative action, there is a tendency toward advanced quotations. This is especially true regarding all grades of sheets, and some makers of plates and shapes are reported to be quoting above prevailing prices.

All grades of pig iron and heavy melting steel have commanded attention the past week. Bessemer has reached the $17, valley, mark—more than 26,000 tons having been sold at that figure today, for prompt and first quarter shipment. A heavy tonnage of first quarter basic and small lots of foundry for similar shipment have sold at $16.25, valley, and malleable has sold above this figure in carload lots. Gray forge has reached $15.25, valley, and it is doubted whether this quotation could be duplicated. Heavy melting steel has advanced in leaps and bounds. An independent consumer has paid $15.50 for a round tonnage of this stock, and it is reported that a large portion of this material offered by a railroad brought $16. Both markets have been excited. Wire products have not advanced in price value, despite persistent rumors to this effect. However, an early advance is expected. Prompt furnace coke is scarce and $3.25, ovens, is the minimum quotation offered by many sellers. No contract coke has been sold this week; it is claimed $2.75, ovens, cannot be shaded.

Pig Iron.—Active buying has begun again, after a lull of several days. The Cambria Steel Co., Johnstown, Pa., has obtained in the neighborhood of 25,000 tons of Bessemer pig iron at $17, valley furnace, for shipment the remainder of this year and through the first quarter. Another sale of 700 tons and still another of about 1,000 tons were made today at $17, valley, to consumers outside this immediate territory. Demand for Bessemer is heavy, and prices on this grade and on basic have stiffened considerably. A consumer outside this district today closed for 10,000 tons of first quarter basic at $16.25, valley, which is the highest officially reported price this year. This transaction closed shortly after the inquiry came out, and many claim this figure is the absolute minimum on basic iron. The Standard Sanitary Mfg. Co. this city, obtained a round tonnage of first half foundry iron a few days ago. It is reported that $16, valley, was paid for the bulk of this tonnage, although a small amount of iron was obtained as low as $15.50, valley. This same company also purchased a round lot of gray forge iron at between $15 and $15.25, valley furnace, for first quarter shipment, and the latter figure is said to be the minimum quotation at the present time. The Allegheny Steel Co., Pittsburgh, has entered for more than 1,000 tons of basic a month, for shipment the first quarter. The National Malleable Castings Co., Cleveland, has closed for a round tonnage of first quarter basic. Foundry iron, in rather small lots, has sold as high as $16.25, valley, and sellers, as a general rule, are refusing to shade this figure.

Malleable, in carload lots, has sold as high as $16.50, for prompt shipment, but no large tonnages have been sold above $16. Demand for all grades is increasing, and despite the heavy sales already made, the bulk of iron for consumption in this territory for the first half of the year is yet to be sold. Many claim it no longer is possible to obtain basic, malleable and foundry at less than $16.25, valley, and some sellers are refusing to quote below $16.50. It is predicted that all idle blast furnaces will be in operation before Dec. 1, although trouble is being experienced in obtaining coke and ore requirements. Quotations for prompt and first quarter iron are identical so far as actual sales are concerned, and we quote all grades as follows:

(Remainder of Year and First Quarter.)

Bessemer, valley	$16.75 to 17.00
Bessemer, Pittsburgh	17.65 to 17.90
Basic, valley	16.00 to 16.25
Basic, Pittsburgh	16.90 to 17.15
No. 2 foundry, valley	16.00 to 16.25
No. 2 foundry, Pittsburgh	16.90 to 17.15
Gray forge, valley	15.00 to 15.25
Gray forge, Pittsburgh	15.90 to 16.15
Malleable, valley	16.00
Malleable, Pittsburgh	16.90

Ferro-Alloys.—Sellers of ferro-manganese have advanced quotations to $61, seaboard, for forward shipment, following action taken by leading eastern agents. No sales above $56.50, seaboard, have been reported. Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, and above, and dealers are refusing to sell for forward shipment. As high as $75 is being asked for prompt ferro-manganese.

We quote 80 per cent ferro-manganese at $61 to $75, Baltimore, for prompt delivery and $56.50 to $61 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted nominally at $72.50 to $75, Pittsburgh, for prompt and forward delivery; 12 per cent, $22; 11 per cent, $21; 10 per cent, $20, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2,000 pounds.

Plates.—Demand for plates continues heavy and most mills already have enough tonnage booked to necessitate maximum operation well into the second quarter. Prices seem to be stiffening, somewhat. The leading interest is now quoting 1.40c and 1.45c, although no tonnage is being booked except for specific work. Some of the independent manufacturers are quoting as high as 1.50c on small tonnages. Specifying continues brisk and the question of shipment is of paramount importance with many plate makers. The Pennsylvania railroad and the New York Central interests have entered the market for more than 5,000 box cars each. Several other roads are expected to enter for additional cars shortly. The following quotations are being firmly maintained:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.40c to 1.45c. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches 0.10c; circles, 0.20c. Plates in widths over, 100 inches up to 110 inches 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches,

0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ¼ inch to and including 3-16-inch plate on thin edge, 0.10c; under 3-16 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets. — Although most of the mills opened books for first quarter shipment a week or more ago, some of them are now hesitating about booking further tonnage at prevailing quotations. Premiums of $2 a ton are being paid for immediate delivery of black, blue annealed and galvanized products. The uncertainty of the market for raw materials has induced many consumers to cover requirements as fully as possible, and the demand is almost abnormal for this time of the year. An early advance affecting all products is predicted by many in the trade, although no official statement to such effect has been made. Specifying continues heavy, and some of the leading producers are from 10 to 14 weeks deferred in shipments. The revised classification of galvanized products, mentioned a week ago, has been adopted by all the mills. The following quotations are being maintained by leading producers, but many consumers are paying premiums of $2 a ton above these figures.

Flat Sheets.

Black Sheets.—Nos. 10-12 gage, $1.80 per 100 pounds; Nos. 13-14 gage, $1.85; Nos. 15-16 gage, $1.90; Nos. 17-21 gage, $1.95; Nos. 22-24 gage, $2; Nos. 25-26 gage, $2.05; No. 27 gage, $2.10; No. 28 gage, $2.15; No. 29 gage, $2.20; No. 30 gage, $2.30.

Tin mill sizes, Nos. 15-16 gage, $1.90 per 100 pounds; Nos. 17-21, gage, $1.95; Nos. 22-24 gage, $2.00; Nos. 25-27 gage, $2.05; No. 28 gage, $2.10; Nos. 29-30 gage, $2.15; Nos. 30½-31 gage, $2.20; No. 32 gage, $2.25.

Blue Annealed.—Nos. 3-8, $1.50 per 100 pounds; Nos. 9-10, $1.55; Nos. 11-12, $1.60; Nos. 13-14, $1.65; Nos. 15-16, $1.75.

Galvanized.

Nos. 10-11 gage, $2.30 per 100 pounds; Nos. 12-14 gage, $2.40; Nos. 15-16 gage, $2.55; Nos. 17-21 gage, $2.70; Nos. 22-24 gage, $2.85; Nos. 25-26 gage, $3.00; No. 27 gage, $3.15; No. 28 gage, $3.30; No. 29 gage, $3.45; No. 30 gage, $3.60.

Roofing Sheets.

Net extras on all gages per 100 pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate. — Specifying continues heavy, and the prolonged canning season has caused some new demand. So far as can be learned, all the mills have opened books for first quarter shipment, although buying is not so heavy as some of the mills expected. The $3.60 quotation is being firmly held. Scarcity of tin bars has handicapped some of the mills to a considerable extent. The prevailing quotation follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburgh district.

Rails and Track Material.—Although this is normally the quietest season of the year for mills rolling steel rails, all of the rail mills are operating at capacity, and some of them have more specified tonnage on their books than at any time for several months. There has been heavy demand for both standard and light rails, and leading railroads in the east are beginning to cover 1913 requirements, as is indicated in reports from New York. It is impossible to obtain open-hearth standard sections in less than three months, although mills are able to ship Bessemer rails in six or seven weeks. Demand for spikes continues rather heavy, and several important inquiries are pending. All spike makers are quoting $1.80 on standard spikes. Rails are quoted at follows, with the base price on open-hearth steel sections 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, Pittsburgh; track bolts, 2.00c to 2.10c, Pittsburgh.

Railroad Spikes.

4½, 5 and 5½ and 9-16	$1.80
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7-16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets and Sheet Bars.—Several small tonnages of semi-finished steel products were sold the middle of last week by a Mahoning valley interest, and advanced price values on billets and sheet bars have been obtained. It is the general consensus of opinion in the trade that Bessemer billets are not obtainable at less than $25.50; Bessemer sheet bars at less than $26, and open-hearth billets and sheet bars are being firmly held at $26 and $27, Youngstown and Pittsburgh, respectively. Consumers have offered $27.50, makers' mill, for open-hearth products, but have been unable to obtain material. It is reported that one of the mills in this district has sold open-hearth sheet bars for first quarter shipment at around $26, but this sale cannot be verified. Revised quotations follow:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $25.50, with the usual extra for size and analysis, and open-hearth rolling billets, $26.00. Bessemer sheet and tin bars are quoted at $26.00, and open-hearth sheet bars are quoted $27.00, f. o. b. Pittsburgh and Youngstown for fourth quarter, with full freight to destination added. Forging billets are quoted at $31.00 to $32.00, Pittsburgh.

Hoops and Bands. — New demand continues heavy and specifications are to the full extent of contracts in all instances. The leading interest continues to quote the minimum quotations listed below, and independent manufacturers are asking $1 a ton above these figures. Quotations follow:

Hoops in carload lots, 1.45c to 1.50c; Pittsburgh; in less than carload lots, 1.50c to 1.55c; bands 1.35c to 1.40c, base, with net extras, as per standard steel.

Merchant Bars.—Many of the mills already have booked enough tonnage to necessitate plants operating at capacity well into the second quarter of the new year. On account of the demand, manufacturers are scrutinizing tonnages carefully, and reductions are the rule rather than the exception. Shipments are heavy, and all of the mills are deferred in deliveries. Some makers are quoting 1.40c, and it has been rumored that an early advance in price value would be announced by leading producers. This report is unfounded. Iron bars are being quoted at 1.55c, although it is claimed desirable tonnages can be placed at 1.50c. All the mills have advanced cold-rolled shafting, following the lead of the Columbia Steel & Shafting Co., and it is believed impossible to shade 60 per cent off for carloads and 55 per cent off for less than carloads. Mills have filled tonnages placed at quotations $2 and $4 a ton lower than those prevailing. Quotations follow:

Common iron bars, 1.50c to 1.55c, Pittsburgh; Bessemer and open-hearth steel bars, 1.35c; plow and cultivator, 1.35c, channels, angles, zees, tees, under 3 inch, 1.45c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds and not less than 1,000 pounds of a size, 0.15 advance, less than 1,000 pounds, 0.35. Cold rolled, and ground shafting, 60 per cent off in carloads and 55 per cent in less than carloads delivered in base territory.

Muck Bar.—Muck bar is quoted at $31, Pittsburgh, although the absence of sales makes this quotation merely nominal. No sales have been reported for several weeks, as consumers covered requirements earlier in the year. Trouble continues to be experienced in obtaining puddlers.

Bolts, Nuts and Rivets. — Several makers announced that they have booked small tonnages for first quarter delivery at 5 and 10 per cent above prevailing quotations, according to size. Specifying continues brisk and new demand keeps up in good shape. That an irregular advance will be announced before books are formally opened for shipment for first quarter is the claim made by many in the trade. Quotations follow:

Rivets

Button head structural rivets, $1.90; cone head boiler rivets, $2.

Bolt and Nut Discounts

Carriage bolts, ⅜ x 6 inches, smaller and

shorter, cut threads, 75, 10 and 2½; larger and longer, 70, 10.

Machine bolts with hot pressed nuts; ⅜ x 4 inches, smaller and shorter, rolled, 75, 10, 10 and 2½; cut, 75, 10 and 7½; larger and longer, 70, 10 and 5.

Gimlet and cone point lag or coach screws, 80 and 12½.

Hot pressed square, blank or tapped nuts, $5.90 off list; hot pressed hexagon blank or tapped, $6.55.

Cold pressed C. & T. square, blank or tapped, $5.90 off; hexagon, blank or tapped, ⅝-inch and larger, $6.85 off; smaller than ⅝-inch, $7.45 off.

Structural Shapes.—The leading interest is quoting 1.40c and 1.45c on structural shapes and the latter figure is being quoted by other manufacturers. Some mills are asking 1.50c on small tonnages. Demand continues heavy and it will be well into the second quarter before all the tonnage now booked can be shipped. The McClintic-Marshall Construction Co. has taken 1,000 tons for a mill building to be erected at Butler, Pa., by the Forged Steel Wheel Co., and 400 tons for the Court theater, Boston. Several important inquiries are pending. Quotations are as follows:

Beams and channels, 15 inches and under, zees, 1.40c to 1.45c; tees, 1.45c to 1.50c; angles, from 3 to 6 inches, 1.40c to 1.45c; over 6 inches, 1.50c to 1.55c; universal and sheared, 1.40c to 1.45c.

Merchant Pipe.—Makers of iron and steel pipe report that demand continues heavy, although no large orders have been placed. Mills have not been able to catch up in shipments and considerable complaint continues to be heard from consumers. Jobbers have attempted to obtain tonnage for first quarter shipment, but have been unsuccessful. An inquiry for eight miles of 8-inch line pipe for Canadian shipment probably will close before the end of the week. Official discounts to jobbers, subject to the usual preferential discount to the large consumers, are as follows:

Iron and Steel Pipe Basing Prices

STEEL.

	Butt.		Lap.	
	Black.	Galv.	Black.	Galv.
⅛, ¼ and ⅜ inch.	72	52	..	..
½ inch	76	66	..	..
¾ to 3 inch	79	71	..	..
2 inch	..	..	76	68
2½ to 6 inch	..	..	78	70
7 inch to 12 inch	..	..	76	66
13 to 15 inch	..	..	53	..
Extra Strong, Plain Ends.				
⅛, ¼ and ⅜ inch.	68	58	..	..
½ inch	73	67	..	..
¾ to 1½ inch	77	71	..	..
2 to 3 inch	78	72	..	..
2 inch	..	..	74	66
2½ to 4 inch	..	..	76	68
4½ to 6 inch	..	..	75	67
7 to 8 inch	..	..	68	58
9 to 12 inch	..	..	63	53
Double Extra Strong Plain Ends.				
½ inch	63	57	..	..
¾ to 1½ inch	66	60	..	..
2 to 2½ inch	68	62	..	..
2 inch	..	..	64	58
2½ to 4 inch	..	..	66	60
4½ to 6 inch	..	..	65	59
7 to 8 inch	..	..	58	48

IRON.

⅜ inch	67	51	..	..
½ inch	70	57	..	..
¾ to 1½ inch	73	62	..	..
2 and 2½ inch	74	63	..	..
2 inch	..	..	70	61
2½ to 4 inch	..	..	72	64
4½ to 6 inch	..	..	71	63
7 to 12 inch	..	..	69	56
Extra Strong Plain Ends, Card Weight.				
⅜ inch	64	53	..	..
½ inch	68	61	..	..
¾ to 1½ inch	72	63	..	..
2 and 2½ inch	73	64	..	..
2 inch	..	..	67	61
2½ to 4 inch	..	..	71	64
4½ to 6 inch	..	..	70	63
7 to 8 inch	..	..	64	54
9 to 12 inch	..	..	59	48
Double Extra Strong Plain Ends, Card Weight.				
½ inch	58	50	..	..
¾ to 1½ inch	61	53	..	..
2 and 2½ inch	63	55	..	..
2 inch	..	..	56	50
2½ to 4 inch	..	..	61	55
4½ to 6 inch	..	..	60	54
7 and 8 inch	..	..	53	43

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes.—The market for locomotive and merchant tubes continues about the same. Specifications against contracts continue heavy and there is some new demand. The following discounts prevail, although some makers are quoting $2 a ton above this list:

	Steel.	Iron.
1½ inch	..	..
1¾ to 2¼ inch	62	47
2½ inch	64½	52
2¾ to 3½ inch	69½	54½
3½ to 4½ inch	72	57
5 and 6 inch	64½	..
7 to 13 inch	62	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire. — Wire products have not been advanced, despite persistent rumors to this effect. There has been considerable demand for next year's tonnage, and some of the mills have booked orders at $1 a ton above the present $1.70 base for wire nails. It is believed that wire products will be advanced by the middle of the month, according to those who are in close touch with this market. Shipments to all parts of the country continue heavy, and the wire market is stronger than it has been at any time this year. The following quotations prevail:

Wire nails, jobbers' carload lots, $1.70; retailers' carload lots, $1.75; cut nails (western makers), jobbers' lots, $1.65 to $1.70, painted barb wire, jobbers' carload lots, $1.70; retailers' carload lots, $1.75, with 30c for galvanizing; plain wire to jobbers in carloads, $1.50; and to dealers, in carloads, $1.55; polished staples, $1.70; galvanized staples, $2.00.

Wire Rods.—Rather heavy tonnages are involved in pending inquiries for wire rods, despite the fact that the heaviest consumers covered requirements earlier in the year. Bessemer and open-hearth wire rods are quoted at between $27 and $28, Pittsburgh, although some mills are asking $28 and $29.

Coke.—Many conservative producers and sellers of Connellsville furnace coke claim there is absolutely no prompt coke to be obtained at less than $3, ovens. As high as $3.25, ovens, has been paid for rather large tonnages for prompt shipment. No transactions for contract coke have been closed for more than a week and the market has not gone above $2.75, ovens, so far as actual sales are concerned. This figure has been paid by several consumers. About 10,000 tons of foundry coke have sold at $3.25 for shipment the first six months of 1913, and sellers are now asking $3.50, ovens, as a general rule. A consumer outside this district has paid $3.50, ovens, for a small tonnage of prompt foundry coke. Excitement of the last two weeks has caused the usual differential between the two grades to entirely disappear and both furnace and foundry fuels are quoted on approximately the same basis. The Connellsville *Courier*, for the week ending Sept. 28, says that production gained 8,996 tons over the week before. Merchant ovens made the larger gain. Shipments gained 163 cars. The following quotations prevail:

Connellsville furnace	$2.85 to 3.25
Connellsville furnace contract	2.50 to 2.75
Connellsville foundry	3.00 to 3.25
Connellsville foundry contract	3.00 to 3.25

Old Material.—The market for heavy melting steel has been as excited as that for pig iron and coke. A leading independent mill has paid $15.50 for a round tonnage of high grade heavy melting stock, and another independent consumer is reported to have offered that figure for about 25,000 tons for rather prompt shipment. A consumer outside this immediate territory is reported to have paid $16 for a large portion of the heavy melting steel offered by the Pennsylvania railroad the end of last week, and dealers are refusing to shade that figure in many instances. Excitement is confined to heavy melting steel, although demand for other stocks is good. Rerolling rails have been selling at $1.50 above the minimum quotation of a week ago and several sales of machine shop turnings have been made above $11. No. 1 cast has sold as high as $14. Quotations per gross ton for delivery in the Pittsburgh district, including Brackenridge, Steubenville and Follansbee, are as follows:

Heavy melting scrap	$15.00 to 15.50
Rerolling rails	16.50 to 16.75
Malleable	13.00 to 13.50
Bundled sheet scrap	12.25 to 12.50
Iron axles	24.00 to 25.00
Old iron rails	16.25 to 16.50
Stove plate	10.50 to 11.00
No. 1 wrought scrap	14.75 to 15.00
Old car wheels	15.00 to 15.50
Low phosphorus	17.50 to 18.00
Machine shop turnings	11.00 to 11.25
Cast borings	9.75 to 10.00
No. 1 cast scrap	13.50 to 14.00

CHICAGO

Heavy Order for Car Material---Record Specifications

Office of THE IRON TRADE REVIEW, 1328 Monadnock Blk., Oct. 8.

Specifications received by subsidiaries of the Corporation in this territory for September exceed any previous month during the year and break all records for a like time in the history of the industry. Finished lines are very strong and it is becoming impossible to place business for first half delivery even with some of the independent producers. One of the latter has exhausted its first quarter capacity and is taking business for second quarter only at the insistent demands of old customers. The American Car & Foundry Co. has placed orders for 100,000 tons of plates, shapes and bars for car building. As an indication of the present situation in this market, a prominent western railroad has been unable to obtain plates for car building from any source. Fabricators are having increasing trouble with deliveries and the jobbers throughout the district are short on many sizes in both shapes and sheets. On account of this shortage they are able to make deliveries more promptly, in some instances in from four to five days.

Pig Iron.—The market has relapsed into a state of comparative quiet, in view of the activities of the past few weeks. Inquiry for all grades, however, continues good and some heavy sales, particularly of basic, have been made. Sales of southern iron include two for 1,200 and 300 tons respectively, both for first quarter, on a basis of $13.50, Birmingham. Among inquiries for southern iron are three for 3,000, 1,000 and 1,500 tons. Inquiry for spot shipment is increasing and it is thought in some quarters that an active market for early delivery will develop. Many melters throughout the territory report that they are covered until July 1, but only for requirements based on the volume of business now on the books. Any increases in the latter will in all probability bring about another buying movement. With the majority of the southern producers, $14, Birmingham, is now the minimum quotation and in two instances $14.50 is being adhered to. The minimum southern quotation, however, is now $13.50, for the remainder of the year, the same for first quarter, and $14 for second quarter, making an average of $13.75, for first half delivery. The minimum for first quarter, however, may be withdrawn at any time.

Northern iron is very strong and an advance over the minimum of $17, local furnaces, is expected daily. Chicago interests have made heavy sales of all grades recently and even with the addition of the new stack which is expected to be in blast within 30 days, it is estimated that the capacity of this territory will be well taxed. The leading interest reports all its furnaces, both northern and southern, well sold up and is reluctant to quote for any delivery. Among sales reported during the week is one to a Joliet stove manufacturer consisting of 1,700 tons at a price understood to be $17, f. o. b. local furnaces.

The following prices represent the market for Chicago delivery, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces:

	Rest of year.	First quarter.
Lake Superior Charcoal	$18.75	$19.25
Northern foundry No. 2	17.00	17.00
Southern foundry No. 2	17.85	17.85
South'n Silveries, 5 per cent sil.	19.35	.....
Jackson co. silv'r's 8 per cent..	20.40	21.40
Malleable Bessemer	17.00	17.00
Alabama basic	18.35	.....

Merchant Bars. — No material changes have been brought about in the market for merchant bars with the exception that producers in this territory are quoting higher prices for soft steel bars for any delivery. Bar iron is very firm at a minimum of 1.50c and the makers are having greater trouble with deliveries. One independent producer in this territory has no available tonnage for first quarter and is taking business for second quarter only at the insistent demands of old customers. The leading interest remains out of the market for this material and it is becoming increasingly difficult to place business for delivery during the first half.

We quote, f. o. b. Chicago, as follows:

Bar iron, 1.50c, hard steel bars, rerolled, 1.40c to 1.45c; soft steel bars, bands and small shapes, 1.58c; hoops, 1.58c to 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 60 per cent off list for carload lots, 55 per cent off for less than carloads.

On iron and steel from local stock we quote as follows:

Bar iron, 1.90c per pound base; soft steel bars, 1.90c per pound base; soft steel hoops, 2.20c, full extras.

Structural Material.—The inadequate open-hearth capacity in this territory is greatly affecting the structural market and fabricators are having even more difficulty in securing figures on which to base their bids. Any business for delivery during the first half is very difficult to place and jobbers in this district are very short on many sizes. The leading interest continues out of the market and independents are taking such business as can be placed. The structural contracts placed during the week show considerable improvement, amounting to 5,411 tons, of which the American Bridge Co. has taken one contract consisting of 650 tons of bridge material from the Chicago & Alton Railway Co. The Wisconsin Bridge Co. has taken 2,700 tons from the Great Northern Railway Co. for various bridges and the Toledo Bridge & Crane Co. has taken 1,340 tons from the city of Chicago for the Ninety-second street bridge. The Vierling Steel Co. has taken 138 tons from the Parmelee Transfer Co. for a garage at Monroe and Aberdeen streets, Chicago; the St. Paul Foundry Co. has taken 145 tons from the University of Minnesota for the construction of Millard Hall and Noelke-Richards has taken 276 tons from William Ernest Walker, for an apartment building at Walton place and the Lake Shore drive, Chicago. A contract has also been let by the Sound Construction & Engineering Co. for 162 tons of structural material for additions to buildings in Seattle, Wash.

We quote, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.63c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $2.00 per 100 pounds; angles over 6 inches, $2.10 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $2.00 per 100 pounds,

base; channels, 3 inches and larger, $2.00 per 100 pounds, base.

Rails and Track Fastenings.—The leading interest continues to book heavy orders in both rails and track fastenings for delivery during the first half of the ensuing year and it is estimated that rail purchases for that period will exceed those for any like time in the history of the industry. Western roads continue to anticipate their requirements in track fastenings and large tonnages are being booked both by subsidiaries of the Corporation and independent producers in this territory. Prices on track fastenings are stronger, the minimum quotation on railroad spikes having disappeared and the market for track bolts hardening to $2.30. Rail orders placed during the week include 5,000 tons taken by the St. Louis & Southwestern from the Illinois Steel Co. and 6,000 tons taken by the San Antonio & Aransas Pass from the Maryland Steel Co.

We quote, light rails, f. o. b. Chicago, and track fastenings, f. o. b. Joliet, as follows:

Light rails, carloads, 25 to 45-pound, 1.30c; 16 to 20-pound, 1.35c; 12-pound, 1.40c; 8-pound, 1.50c.

Light section relayers, 45 pounds and under, subject to inspection, $22 to $24; standard section relaying rails, subject to inspection, $23 to $24.

Track fastenings, f. o. b. Joliet, angle bars, 1.50c; railroad spikes, 1.90c; smaller size spikes, 1.70c base; track bolts with square nuts, 2.25c to 2.30c.

Plates.—From the standpoint of the car builders the situation in the plate market is becoming decidedly embarrassing. One of the leading makers in this territory has been forced to refuse an order from a western railroad for shapes to be used in car and locomotive building. Railroad buying has no appearance of falling off and a number of fair orders have been taken during the week. The Grand Trunk is in the market for about 100 passenger cars and the Northern Pacific is in the market for 3,000 40-ton box cars and for 1,500 35-ton refrigerator cars. The Chicago & Northwestern is reported in the market for about 2,000 box cars. The last item has not been confirmed. The American Car & Foundry Co. has placed a large contract with Chicago mills for about 100,000 tons of plates, shapes and bars to cover its requirements for 10,000 cars for western railroads. Car builders in this territory are booked with orders farther in advance than they care to say and, it is thought, far in excess of the belief of most of the trade. The leading interest continues its refusal to quote on plates and as the leading independents are able to take very little business for first half delivery, current quotations are largely nominal. Store prices are very strong and the demand increasingly heavy.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6⅜ to 100 inches wide, 1.63c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, 2.00c.

Bolts, Nuts and Rivets.—Prices under the market continue to be offered in this territory, particularly in structural rivets, for which western producers have considerable unfilled capacity. Bolts and nuts are very firm at the prevailing quotations and in some instances the makers are having difficulty in meeting the requirements of their customers.

We quote, f. o. b. Chicago, as follows:

Rivets

Structural rivets, ¾ to 1¼ inches, 1.98c to 2.08c, base, Chicago, in carload lots; boiler rivets, 0.10c additional.

Bolt and Nut Discounts

Carriage bolts up to ⅜ x 6 inches, rolled thread, 75-10-2-½; larger sizes, 75-10.

Machine bolts, up to ⅜ x 4 inches, rolled thread, 75-10-10-2-½; cut thread 75-10-7-½; larger sizes, 75-10-5.

Hot pressed nuts, square head, $5.90 off per cwt.; hexagon, $6.55 off per cwt.

Sheets.—The increasing demand for sheets, together with a shortage in jobbers' stocks, is causing great congestion in this market. Changes in the differentials which brought about higher quotations on some sizes have had no effect on the demand and prices are very strong. Few independent producers are able to take any appreciable tonnage for first quarter and the mills of the leading interest find conditions parallel to those maintaining for bars, plates and shapes.

We quote, f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.15c; No. 12, 2.20c. Box annealed, No. 28, 2.70c. Galvanized No. 28, 3.95c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products.—No diminution in the demand for wire products is apparent and prices are increasingly strong. The requirements for wire nails seem to be in excess of those for other grades of wire products, with fencing a close second.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.88; retailers' carload lots, $1.93, retailers' less than carload lots, $1.98; painted barb wire, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $1.98, with 30c for galvanizing; plain wire, jobbers' carload lots, $1.68; retailers' carload lots, $1.73.

Merchant Pipe and Tubes.—Makers in this territory report that they are catching up somewhat with the demand, although the requirements of both jobbers and consumers are unabated. Prices are very strong, with a marked upward tendency and further advances on all grades are expected before the first of the year.

We quote, store prices on merchant pipe and tubes, as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	41.2
⅜ inch	73.2	62.2	67.2	51.2
½ inch to 1½ inch.	76.2	67.2	70.2	58.2
Lap.				
2 inch	73.2	64.2	67.2	57.2
4½ inch to 6 inch..	75.2	66.2	68.2	59.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	66.2	55.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	59.2	47.2
½ inch	69.2	57.2	64.2	52.2
2 inch to 3 inch....	74.2	62.2	....	....
Lap.				
2 inch	70.2	58.2	65.2	53.2
7 inch to 8 inch....	64.2	52.2	59.2	47.2
Double Extra Strong.				
Butt.				
½ inch	57.2	45.2	....	....
¾ inch to 1¼ inch	63.2	48.2	....	....
Lap.				
2 inch	58.2	46.2	....	....
4½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes.

	Lap weld steel.	Charcoal iron.	Shelby seamless.
	Per cent.	Per cent.	Per cent.
1 inch	37	..	55½
1¼ to 2¼ inch.....	53	38	34
2¾ to 3¼ inch.....	63	48	44
3½ to 4½ inch.....	65½	48	44
5 to 6 inch.....	53	..	..

Cast Iron Pipe.—Minster, O., has placed a contract for 160 tons of water pipe and the United States Cast Iron Pipe & Foundry Co. has taken 750 tons from the city of Bridgeport, Ill. The high price of pig iron is increasing the difficulties of the pipe makers, as it is not profitable to build up stocks during the winter with high raw material costs. Although inquiry for small tonnages is good, no larger lots are expected in the market until next year's requirements can be estimated. Corporations, however, are evincing considerable interest in their future requirements, as it is thought that higher prices must come before long.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $30, 6 to 12 inches, $28, larger sizes, $27; gas pipe, $1 a ton higher.

Old Material.—The upward tendency in the scrap market continues

in spite of the imminence of large offerings by the railroads. The latter continue to pile up scrap along the right-of-way on account of a dearth of labor for moving it. Much speculative trading is being done among dealers and large lots have been bought at the top of the market. Demand from foundries is greatly in excess of that from other consumers, as the mills almost without exception have large stocks on hand. One large consumer in this market is overstocked and reports that it is out of the market for the present. A list has been issued by the Great Northern railway consisting of 5,831 tons of mixed scrap, of which the principal items are 1,200 tons of No. 1 steel rails and 560 tons of malleable castings. Bids on this list will be closed tomorrow. The Santa Fe has also invited bids on a small list.

We quote, for delivery in consumers' yards, Chicago, as follows:

Gross Tons

Old car wheels	$14.75 to 15.25
Old iron rails	17.00 to 17.50
Rerolling rails (5 ft. and over)	15.75 to 16.25
Old steel rails (3 ft. and und.)	14.50 to 15.00
Frogs, switches and guards	13.75 to 14.25
Heavy melting steel	13.75 to 14.25
Shoveling steel	13.50 to 14.00

Net Tons

No. 1 R. R. wrought	$13.75 to 14.25
No. 2 R. R. wrought	12.75 to 13.25
Arch bars and transoms	17.25 to 17.50
Knuckles, couplers and springs	12.75 to 13.25
Shafting	16.50 to 17.00
Iron car axles	21.75 to 22.25
Steel car axles	18.00 to 18.50
Locomotive tires	13.50 to 14.00
Dealers forge	11.75 to 12.25
Pipe and flues	11.00 to 11.50
No. 1 cast	13.75 to 14.25
No. 1 busheling	12.00 to 12.50
No. 2 busheling	8.75 to 9.25
No. 1 boiler cut	10.50 to 11.00
Boiler punchings	13.00 to 13.50
Cast and mixed boring	8.00 to 8.25
Machine shop turnings	8.75 to 9.25
Railroad malleable	13.75 to 14.25
Agricultural malleable	12.25 to 12.75
Angle bars, splices, etc., iron	16.00 to 16.75
Angle bars steel	13.25 to 13.75
Stove plate and light cast scrap	10.50 to 11.00

CLEVELAND

Contract for Corrigan-McKinney Mills

Office of THE IRON TRADE REVIEW,
Penton Bldg., Oct. 8.

Iron Ore. — September was the fourth month of the year in which ore shipments exceeded 7,000,000 tons. The movement still continues very heavy and in the opinion of some observers the movement for the year will amount to 46,000,000 tons, although 45,000,000 tons is the estimate usually made. If the car shortage becomes acute, it will be an important factor in reducing ore shipments. Ore shippers are, as a rule, well supplied with vessel tonnage. More vessels have been available for the ore trade on account of grain not coming forward rapidly enough to keep the vessels employed.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $3.75; Mesabi Bessemer, $3.50; old range non-Bessemer, $3.00; Mesabi non-Bessemer, $2.85.

Pig Iron.—Pig iron prices along the lake continue to advance at a surprising rate. While the Cleveland market is firm, and some iron has been sold at $16.50, furnace, for No. 2 for the first half of next year, the market at other lake cities, particularly Toledo, Buffalo and Detroit, is even stronger. A large consumer at Detroit bought a round tonnage at a sharp advance over recent quotations. Valley makers have no difficulty in selling malleable and No. 2 foundry at $16.25 to $16.50 at their furnaces. Gray forge is very scarce in the valleys. It now seems probable that the Ella furnace, at West Middlesex, Pa., will not be blown in as soon as has been expected. For delivery during the remainder of this year and the first half of next year, we quote as follows, delivered in Cleveland:

No. 1 foundry	$16.75 to 17.25
No. 2 foundry	16.25 to 16.75
No. 2 southern	16.85 to 17.35
Bessemer	17.40 to 17.65
Lake Superior charcoal	19.10 to 19.75
Jackson co. 8 per cent silvery	19.55

Coke.—The coke market is very strong and the supply is not equal to the demand. Increasing difficulties are being experienced in getting laborers at the ovens. Some ovens making coke high in sulphur and ash are preparing to go in, if laborers can be obtained. It is extremely difficult to buy any stock coke.

Connellsville furnace coke, $2.85 to $3.25 for prompt delivery, and $3.00 to $3.25 on contract; Connellsville foundry coke, $3.00 to $3.25 for prompt, and $3.00 to $3.25 on contract.

Finished Material.—The placing of the contract for 17,000 tons of structural material by Corrigan, McKinney & Co. for the mills at their new plant on the Cuyahoga river, was the largest transaction of its kind ever made in Cleveland. The steel will be furnished and the buildings designed and erected by the American Bridge Co. Erection will be started about April 1, 1913, and it is expected that it will be completed in about a year.

The Eastern Steel Co. has again advanced its quotation on shapes $2 per ton, making the new quotation 1.55c, Pottsville, for November and December delivery. A central Pennsylvania plant is quoting 1.60c, mill, on plates for delivery within three weeks. Eastern Pennsylvania makers are quoting 1.55c, mill, on universal, and 1.50c on sheared plates for early delivery. The Carnegie Steel Co. continues its very conservative policy of selling for delivery after Jan. 1 only to give protection against specific jobs. Independent concerns are contracting more freely, but usually are making contracts with the regular customers only. A sale of 3,000 tons of bar iron was made to the Lake Shore railroad.

The King Bridge Co. was the lowest bidder on the steel for the new Detroit-Superior bridge, bidding $152.50 a ton under the specifications requiring both nickel and plain steel, a total of $571,875, and $130.70 on carbon steel, a total of $571,812.50. Other bidders were the McMyler Interstate Co., Bedford, O., and the Pennsylvania Steel Co.

Old Material.—The market is extremely strong with scrap scarce. Miscellaneous scrap is hard to obtain, and, although dealers are offering advanced prices, few lots are being received in this district. Railroad and agricultural scrap is coming in very slowly. The outside demand for heavy melting steel is insistent. One outlying plant, after offering an advanced price for steel-making scrap a few days, has asked the same dealer for his figures on whatever tonnage he has to offer. The supply in the hands of the dealers is low and they are reluctant to accept orders. The scarcity of heavy stock is increased

owing to the demand for low phosphorus scrap. This grade has been going into heavy steel for some time, as there has been little demand, but users of low phosphorus are now buying, a tremendous sale having been made at $18, and the supplies of heavy steel have consequently suffered. Stove plate is selling freely, a Canadian interest having taken 1,000 tons while sales have been made across the border of 2,500 tons of No. 1 machine cast. The exports to the Dominion are heavy, as plants there are buying in considerable quantities, and are paying good prices in addition to the $1 duty. We quote, f. o. b. Cleveland, as follows:

Gross Tons.

Old iron rails	$16.50 to 17.50
Old steel rails (under 6 ft.)	15.00 to 15.50
Old steel rails (over 6 ft.)	15.50 to 16.00
Relaying rails	23.50 to 24.00
Old car wheels	13.00 to 13.50
Old steel boiler plate	12.25 to 12.75
Malleable iron (railroad)	14.00 to 14.50
Steel axles	19.00 to 19.50
Axle turnings	12.00 to 12.50
Malleable iron (agricultural)	12.00 to 12.50
Heavy steel	14.00 to 14.50
Country mixed steel	13.00 to 13.50
Bundled sheet scrap	11.50 to 12.00

Net Tons.

No. 1 R. R. wrought	$14.50 to 15.50
No. 1 busheling	12.50 to 13.00
No. 1 machine cast	13.25 to 13.75
No. 1 dealers' wrought	11.50 to 12.00
Machine shop turnings	9.00 to 9.25
Pipes and flues	11.50 to 12.00
Wrought drillings	9.00 to 9.25
Cast borings	8.50 to 9.00
Stove plate	10.50 to 11.00
Wrought iron piling plate	16.00 to 16.50
Wrought iron arch bars	17.00 to 17.50

CINCINNATI

Round Tonnage of Basic Bought

Office of THE IRON TRADE REVIEW, 503 Mercantile Library Bldg., Oct. 8.

Pig Iron.—A local melter has closed for from 15,000 to 20,000 tons of basic iron for first quarter shipment, and another user of basic in this territory is still inquiring for about 15,000 tons, the delivery to include the first quarter. There are also a few other inquiries for basic from St. Louis and Pittsburgh that will total about 10,000 tons. Sales of foundry iron are being made in excess of inquiries, the latter being rather light at present, and generally for small tonnages. The scarcity of certain makes and grades of iron is becoming more noticeable, and some dealers are being forced to turn down attractive inquiries, being unable to get the iron in the amounts and for the deliveries wanted.

The price of southern iron has been slightly advanced, and $15.50, Birmingham, for spot delivery and the last quarter, is now the minimum quotation. This has been bettered during the past two or three days, and on attractive tonnages could probably still be done, but the furnaces making these sales have advanced their quotations, and will undoubtedly be holding them more firmly before the end of the week. Alabama makes are, as a general rule, still being held in excess of the Tennessee grades. In the former state, the price ranges from $13.50 to $14.50, Birmingham, including the last and first quarters, and while these same figures will hold true on some Tennessee makes, they are not as general or as strong as in Alabama.

There is probably no more furnace iron in the Southern Ohio district that can be had below $16, furnace, for any delivery, and a few sales have been made as high as $16.50, Ironton, for the first half. There is, however, quite a little resale iron at $15.50, Ironton, and several contracts have recently been closed at this figure.

The Union furnace at Ironton, O., has been blown in, and will make malleable, car wheel and basic iron. Its capacity will be about 150 tons per day. Lake Superior charcoal iron has been advanced to from $19.25 to $19.75, Cincinnati, and 8 per cent silicon to from $18 to $19, furnace. Southern car wheel iron is now $25.75 to $26.25, Cincinnati.

A large melter in northwestern Kentucky has purchased 2,800 tons of southern Nos. 2 and 3, the former bringing $13.50, Birmingham, for the last quarter. Recent inquiries other than those of basic include 5,000 tons of malleable iron from central Ohio, 400 tons of Bessemer, also from central Ohio, and 1,000 tons of Bessemer, from Detroit. With freight rates $3.25 from Birmingham and $1.20 from Ironton, we quote Cincinnati prices as follows:

Southern foundry No. 1	$17.25 to 18.00
Southern foundry No. 2	16.75 to 17.75
Southern foundry No. 3	16.25 to 16.75
Southern foundry No. 4	16.00 to 16.50
Southern gray forge	15.75 to 16.25
Mottled	15.25 to 15.75
Southern No. 1 soft	17.25 to 18.00
Southern No. 2 soft	16.75 to 17.75
Standard southern car wheel	25.75 to 26.25
Northern No. 2	17.20 to 17.70
Northern No. 3	16.70 to 17.20
Northern No. 4	16.45 to 16.95
Silveries 8 per cent silicon	18.20 to 19.20

Coke.—About 80,000 tons of Wise county furnace coke have been sold within the past week for southern shipment, and there are still inquiries for a large tonnage in the market. A few sales of both Wise county and Connellsville furnace brands have also been closed at $3.25, ovens, and foundry coke from both of these districts has been sold as high as $3.50, ovens, the higher prices on this grade being more prevalent among the Connellsville makers than those in the Wise county fields. Prices in all of the districts are being gradually advanced. Coke of any kind for shipment this year is very scarce, and a number of the dealers will not quote on any delivery up to January, 1913. Pocahontas coke has practically been withdrawn from the market for a time, because of the lack of a supply. We quote below from the leading coke producing districts as follows:

Connellsville district:	Prompt shipment.	Contract second half.
Foundry coke	$3.25 to 3.75	$3.15 to 3.60
Furnace coke	2.85 to 3.25	2.85 to 3.15
Wise county district:		
Foundry coke	$3.00 to 3.50	$3.00 to 3.50
Furnace coke	2.75 to 3.00	2.50 to 3.00
Pocahontas district:		
Foundry coke	$2.90 to 3.15	$2.80 to 3.15
Furnace coke	2.50 to 2.85	2.50 to 2.75
New River:		
Foundry coke	$3.25 to 3.60	$3.15 to 3.60
Furnace coke	2.60 to 2.85	2.55 to 2.85

Finished Material.—The local mill has again advanced its price on sheets, galvanized No. 28 being quoted at from 3.40c to 3.45c, Pittsburgh, for this year's delivery, and at 3.50c, for the first quarter of next year. A differential of 15 cents is also being maintained between galvanized No. 28 and 29, and between Nos. 22, 24 and 26. Black sheets No. 28 are being held at 2.20c, for the last quarter, and at 2.25c for the first quarter, Pittsburgh basis. The mill is from six to eight weeks behind on deliveries, and is not soliciting any new business.

One large firm is today quoting 1.45c, Pittsburgh, on steel bars for second quarter delivery, and 1.55c on structurals for the same shipment. Its prices for other deliveries are 1.35c and 1.40c, for the last quarter, and 1.40c and 1.45c, for the first quarter, Pittsburgh, the lower figures in each case referring to steel bars and the higher figures to structurals. The

majority of the other firms, though, have not advanced beyond 1.40c for steel bars and 1.50c for structurals, Pittsburgh, which prices cover both the first and second quarters.

Warehouse business has slowed up a little during the past few days, and dealers are taking advantage of the situation by attempting to replenish their stocks, which have been greatly reduced by the recent heavy demand. It is thought that this lull is only temporary, however, and that business will improve again soon. Prices have not been advanced within the past week, and are as follows, f. o. b. Cincinnati:

Steel bars, 1.95c, base; iron bars, 1.85c, base; structurals, 2.05c, base; plates, ¼ inch and over, 2.05c, base; sheets, blue annealed No. 10, 2.25c, base; rivets, cone head, 2.35c, base; cold rolled shafting, 58 per cent discount; boiler tubes as follows: 1¼ to 2¼ inch 60 per cent discount; 2½ inch 62 per cent discount; 2¾ to 3¼ inch, 65 per cent discount; 3½ to 4½ inch, 67 per cent discount; 5 to 6-inch 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 2.10c; ⅝ inch square and larger, 2.20c; ½ inch square and larger, 2.30c; 5-16 to ⅜ inch square and larger, 2.50c; ¼ inch square and larger, 2.60c.

Old Material.—The scrap iron market is strong and more active than it has been at any time this year. Prices have also been advanced within the past few days, in some cases as high as 50 cents a ton. Because of the higher quotations, jobbers, both in the city and the surrounding territory, are beginning to bring in more scrap than has been their custom, and they are also canvassing the rural districts, as they can do this now at a fairly good profit. Machine shops are also beginning to save their old material more carefully, and railroads are feeling the market in preparation for selling. We quote below prices dealers will pay and also dealers' selling prices in Cincinnati and vicinity as follows:

Gross Tons

Old iron rails	$13.75 to 14.25
Old steel rerolling	11.75 to 12.25
Old iron axles	18.25 to 18.75
Heavy melting scrap	11.75 to 12.25
Relaying rails	21.00 to 21.75
Bundled sheet scrap	9.00 to 9.50

Net Tons

Old No. 1 R. R. wrought	$11.25 to 11.75
No. 1 machinery cast	11.50 to 12.00
No. 1 busheling	9.75 to 10.50
Stove plate	9.25 to 9.75
Machine shop turnings	7.25 to 7.75
Cast borings	7.75 to 8.25
Heavy turnings	8.00 to 8.50
Mixed cast	10.25 to 10.75
Malleable	8.00 to 8.50

PHILADELPHIA

Prices and Buying Strongly Maintained

Office of THE IRON TRADE REVIEW,
Philadelphia, Oct. 8.

A continuance of general price strength and buying activity is evident on all sides in the eastern market. Eastern steel makers are still slow to accept first quarter contracts, but some further tonnage in plates has been taken at 1.60c, Pittsburgh, or 1.75c, Philadelphia. Shapes are strong with little tonnage available for this year. First quarter steel bars are active, and some favored consumers are specifying in full to July 1. Shortages in pig iron for this year have not been relieved and prices are higher. The first quarter market is steadily advancing. Old material is strong and is rising with other melting materials. Eastern rail mills comprising the Pennsylvania, Bethlehem and Cambria Steel companies will roll about 75,000 tons of the recent Pennsylvania system rail order. The Pennsylvania railroad is now taking figures on 9,000 freight cars of different types.

Pig Iron.—Demand for foundry forge and low phosphorus grades continues active in the eastern Pennsylvania district and this, combined with shortages in some grades, is stimulating future price advances. It is understood that $16.75, delivered, a new high price for pipe iron along the Delaware river, was paid on a lot of 5,000 tons of No. 3 and forge for last quarter. Another consumer took 5,000 tons for pipe manufacture for this year at $16, eastern Pennsylvania furnace, equivalent to $16.70 in this territory. The Baldwin Locomotive Works took 2,000 to 3,000 tons of forge for first quarter. The absolute minimum of the forge market appears to be $16, eastern Pennsylvania furnace. Standard low phosphorus iron has been advanced 50 cents to a basis of $22.50, Philadelphia. Makers are offering little tonnage, either being sold up or declining to quote, and buyers have been clamoring for metal. The situation promises to be rendered more serious by the accident forcing the retirement of one of the Crane furnaces running on this grade, and the probable temporary idleness soon of the Standish, N. Y., furnace. One eastern buyer has been inquiring for 500 tons for this year and 1,200 tons for first quarter. There is good buying of standard foundry brands of No. 2X and this market seems destined for further advance. One Lehigh valley maker has advanced its first quarter schedule to $17, furnace, for No. 2X for first quarter, or $17.75, Philadelphia, with 25 cents higher for 2.50 to 3 per cent silicon, and 50 cents higher for over 3 per cent. Some sales have been made at this schedule. Other makers of standard iron have adopted a similar No. 2X price. For this year, some No. 2X is still available at $17.25, Philadelphia, but this is the present minimum. Virginia No. 2X is selling more freely at $15, furnace, for this year, and at the same price or higher for first quarter. The leading Virginia maker has advanced its price of No. 2 plain, first quarter, 25 cents to $14.75, furnace, but quotes unchanged No. 2X at $15, and lower grades at $14.25, furnace. The Norfolk & Western railroad has closed for about 1,500 tons of No. 1, No. 2X and special low phosphorus foundry with Virginia makers for first quarter, and also 1,500 tons of charcoal, and is still buying some No. 3. A Virginia pipe maker continues out for 3,000 tons of assorted grades, first quarter. An eastern steel maker is inquiring for several thousand tons of basic and special steel-making metal, and one large eastern buyer has recently been sounding out for further basic for first quarter and beyond. Heavy steel works operations are causing some anticipation on basic contracts. A lot of 2,000 tons of basic for Cumberland, Md., delivery is understood to have gone to western makers. It is questionable whether any basic in the east is available under $16.50, delivered, and some makers want $16.75, delivered. An eastern steel maker is understood to have satisfied its inquiry for 1,000 tons of Bessemer.

We quote for prompt and last quarter delivery at consumers' plants

in Philadelphia and vicinity, as follows:

Eastern Pa. No. 1X foundry	$17.50 to 17.75
Eastern Pa. No. 2X foundry	17.25 to 17.50
Eastern Pa. No. 2 plain	16.75 to 17.00
Standard gray forge	16.50 to 16.75
Basic (Eastern and Central Pa.)	16.50
Virginia No. 2X	17.65 to 17.80
Southern No. 2	16.50 to 17.50
Malleable	17.50 to 17.75

(First Quarter.)

Malleable	$17.50 to 17.75
Basic	16.50
Eastern Pa. No. 2X foundry	17.75
Eastern Pa. No. 2 plain	17.25 to 17.50

Iron and Steel Bars.—Eastern agricultural interests holding steel bar contracts up to July 1, have already specified in full these tonnages in order to insure prompt deliveries. There is good buying for first quarter at 1.35c to 1.40c, Pittsburgh, or 1.50c to 1.55c, Philadelphia, and one large tonnage for first quarter is pending. Some makers still hold to conservative policies in quoting the 1.35c price and usually will not enter full tonnages asked. Eastern bar iron makers are stronger in the price views and are quoting 1.45c to 1.50c, or 1.47½c to 1.57½c, Philadelphia mill, but the 1.40c inside price has not disappeared. Steel shafting for first quarter contracts has been advanced 2 points on No. 2 to 60 and 55 off in base territory and screw stock, rounds, No. 3, from 2.20c to 2.35c, Pittsburgh, in carloads, with regular extras for squares and hexagons.

We quote for delivery to consumers' plants in Philadelphia and vicinity: Steel bars at 1.50c to 1.55c, and common bar iron at 1.47½c to 1.57½c. Steel bars from store are quoted at 2.00c.

Plates and Shapes.—Eastern plate makers continue to book freely on October contracts at 1.50c, Pittsburgh, or 1.65c, Philadelphia, and have made some further contracts for first quarter at 1.60c, Pittsburgh, and 1.75c, Philadelphia. They usually do not care to quote for first quarter. One middle western maker has some tonnage to offer for this year at 1.65c, Philadelphia. On first quarter, middle western makers generally are quoting 1.45c, or 1.60c, Philadelphia.

Prompt plates still command premiums in the east. On shapes, one eastern mill is practically out of the year's market and others are quoting 1.45c, Pittsburgh base and upward. For first quarter middle western mills are naming 1.45c, Pittsburgh, or 1.60c, Philadelphia, to regular customers. Eastern makers are not quoting. Over 2.25c, Philadelphia, has been paid in small lots of shapes from store. Eastern mills will furnish 1,000 tons of plates and shapes each for two boats for York river traffic, awarded the Maryland Steel Co. Structural lettings are light. L. F. Shoemaker & Co. have the plant of the American Pulley Co., this city, about 400 tons. A new city pier at Baltimore is being planned and the B. & O. may rebuild with steel its pier in this city destroyed by fire last week. The B. & O. has divided an order for 1,000 center sills between the Pressed Steel Car Co. and the Ralston Steel Car Co.

We quote delivered to consumers' plants in Philadelphia and vicinity: Steel plates, 1.60c to 1.70c; structural shapes, 1.60c to 1.65c. Plates and shapes from store are quoted at 2.15c to 2.25c.

Sheets.—The eastern sheet market is very strong and leading makers are booking liberally, usually at advances over the official Pittsburgh schedule.

We quote for delivery to consumers' plants in Philadelphia and vicinity, No. 10 gage blue annealed sheets at from 1.75c to 1.85c.

Semi-Finished Steel.—Scarcity of raw steel is still apparent in the eastern market and makers have little difficulty to get $28, delivered, on rolling billets. An eastern hardware manufacturer is inquiring for 6,000 tons of open-hearth billets for first quarter. Eastern makers are heavily sold up on steel.

We quote delivered to consumers' plants in Philadelphia and vicinity 4 x 4-inch open-hearth rolling billets at $28 to $28.50 and forging billets at from $32 to $33.

Coke.—Spot lots of mountain coke have been sold to eastern furnaces at $3.25, ovens, equivalent to $2.85, Connellsville district. Eastern iron producers are troubled with coke shortages and in some cases furnace operations are being interfered with. Furnace interests are finding it practically impossible to make new engagements of coke this year to start idle stacks.

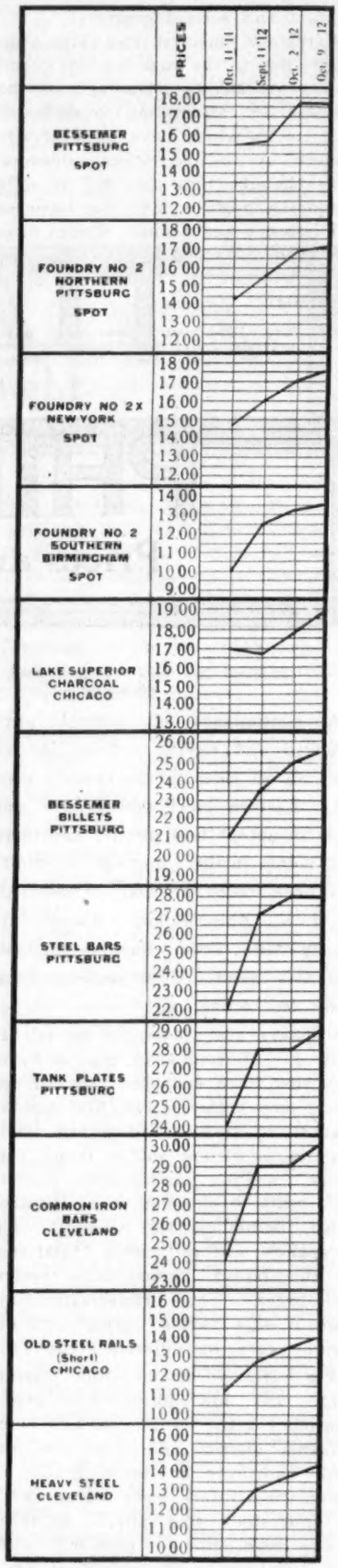
Old Material.—Demand from the Pittsburgh district at favorable prices is drawing more heavily upon old material offerings west of Altoona and at neutral points, and this condition is lending to the strength of the eastern market. The steel works, while not openly in the market, are still taking some heavy melting steel, usually at $15, delivered. For the monthly railroad steel nothing under $14.90, delivered, and in some cases over $15 was paid. There is a good demand for wrought. Up to $17 and over has been done for No. 1 railroad wrought. Wrought pipe has sold freely at $13.50, delivered. Heavy cast is now moving better and $14.50, delivered, for broken material has been paid.

We quote, gross tons, delivered to consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$17.00 to 18.00
Old steel rails (rerolling)	16.00 to 16.75
No. 1 heavy melting steel	14.75 to 15.00
Old car wheels	14.50 to 15.00
Old iron axles	24.00 to 25.00
Old steel axles	18.00 to 18.50
No. 1 railroad wrought	17.00 to 17.25
Wrought pipe	13.50 to 13.75
Cast borings	10.75 to 11.25
Machine shop turnings	11.00 to 11.50
Heavy cast	14.00 to 14.50
Malleable	13.25 to 13.50
Stove plate	10.75 to 11.25
No. 1 forge	13.00 to 13.50
Low phosphorus	18.00 to 18.50

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J., $1.10 to Pottsville, Pa.; Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

PRICE CHART



NEW YORK

Numerous Round Lots of Pig Iron Sold

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Oct. 8.

Iron Ore.—An eastern Pennsylvania furnace interest has closed for 20,000 tons of El Cuero, Cuban, low phosphorus ore for prompt and next year's delivery at 9½ cents per unit, f. o. b. cars Philadelphia. This is the same price at which this grade of material has recently been selling for next year's delivery. There are more or less scattered ore negotiations under way in the east, but many sellers still await action by the lake producers. Bathurst, Nova Scotia, ore is expected to be held at about 7½ cents per unit, Philadelphia, next year, an advance of ½ cent a unit. A new crusher being installed on the property of the Canadian-Venezuelan Ore Co., Ltd., at Imataca, Venezuela, is expected to be completed about the middle of November and this seller will then be in a position to ship more freely to the eastern market. It will probably not be able to ship heavily, however, for a year or more. Cuban ore receipts at present are heavy. The leading producer there brought in at Baltimore in September about 80,000 tons and about 50,000 tons from Cuba were also received at Philadelphia. Total foreign ore imports in September were about 180,000 tons.

Pig Iron.—Heavy buying by several large consumers in the metropolitan and New England districts during the past few days has featured what has continued to be a very strong but only moderately active market. A manufacturer of radiators and heating equipment closed for 10,000 tons of No. 2X with a maker in the Buffalo district for first half shipment to Norwich, Conn. It is understood that delivery will be made largely by tidewater and that the price was $17.75, delivered, equivalent to $16 at the furnace. This buyer also placed a round tonnage of No. 2X for first half Uniontown, Pa., delivered, and several thousand tons of 4 to 5 per cent silicon iron with an eastern Pennsylvania maker for both Uniontown and Norwich. Another Connecticut buyer took 8,000 tons of practically No. 1 for first half for tidewater shipment by the same Buffalo maker, at a slightly higher delivered price. A New Jersey stove builder took 5,500 tons of No. 2X for first half, considerable of which went at $17.50, delivered. The American Radiator Co. has also made additional recent purchases for eastern delivery aggregating 5,000 tons or more. The International Steam Pump Co. officially announces that its recent purchases of pig iron for delivery throughout 1913 have aggregated 50,000 tons, most of which had been previously reported. Considerable small lot selling at Jersey points is being done at prices ranging from $17.20 to $17.50, for No. 2X for this year's delivery, and $17.50 to $17.75 for first quarter and half. One consumer there took 1,500 tons, another 700 to 800 tons and a third 400 tons. Eastern Pennsylvania standard No. 2X for this year is usually held at a minimum of $16.50, furnace, or $17.20, tidewater, and around $17, furnace, or $17.75, tidewater, for first quarter and half. Some eastern sellers with higher freights have recently quoted for forward shipment as low as $16.25, furnace, but the market, as a whole, is quite free from concessions. Buffalo iron is advancing and the $16, furnace, price seems to be disappearing. One maker this week advanced 25 cents to $16.50 for 2 to 2.50 per cent silicon, and $16.75, furnace, for higher silicon content. We quote for prompt and last quarter shipment at tidewater, as follows:

Northern foundry No. 1	$17.50 to 17.75
Northern No. 2X foundry	17.20 to 17.50
Northern No. 2 plain	17.00 to 17.20
No. 2 Virginia	17.50 to 17.75
No. 2 southern foundry	17.50 to 18.00
Malleable	17.00 to 17.25
Gray forge	16.25 to 16.50

(First Quarter.)

Northern No. 2X foundry	$17.50 to 17.75
Northern 2 plain	17.25 to 17.50
No. 2X Virginia	17.80 to 18.00
No. 2 Southern	18.00 to 18.50

Ferro-Alloys. — Both English and German makers of ferro-manganese at the beginning of this week formally advanced their price for delivery after Jan. 1, to $61, seaboard, or $4.50, above the lowest forward price of $56.50, seaboard, previously ruling, as some sellers had never withdrawn from that figure. Ferro-manganese is now selling at the highest price since July, 1907. Prompt ferro prior to the advance of forward material, was quoted at a minimum of $65 and some sellers have obtained only slightly below this price on small lots of forward material. An eastern steel maker took 250 tons for first half prior to the advance. Some sellers of 50 per cent ferro-silicon are holding for a minimum of $75, Pittsburgh or Philadelphia, for delivery this year or first quarter. We quote 80 per cent ferro-manganese at from $65 upward for early shipment and at $61, seaboard, for delivery after Jan. 1 and 50 per cent ferro-silicon for forward shipment at $75, Pittsburgh, or Philadelphia, for carloads, $74, for small lots, and $73 for 600 tons or more. For this year the schedule is $2.50, less.

Cast Iron Pipe.—Alert buyers among the gas and water companies are showing an appreciation of the rising market by endeavoring at this time to cover for their requirements for next year. Makers where they will quote, usually ask round advances for such deliveries. The market continues active. The United States Cast Iron Pipe & Foundry Co. took 850 tons of 16 to 24-inch for Jamestown, N. Y., at $22.90, delivered, Virginia makers will furnish about 4,000 tons of 24-inch for Portsmouth, Va. We quote, 6-inch pipe at from $23 to $24, f. o. b. New York in carload lots.

Finished Material.—With their outputs substantially booked for all of this year or well into December, eastern producers of finished lines are approaching the naming of first quarter prices with conservatism. Usually they decline to quote, but in cases where quotations have been made they have usually represented advances of $2 or more over today's schedules. Plates for first quarter have been quoted by eastern sellers at 1.60c or 1.76c, New York, and some business in the eastern district has been done on this basis. For the earliest deliveries possible for this year, 1.50c, Pittsburgh, or 1.66c, New York, is usually quoted on shapes and plates and premium prices for extra prompt shipments are still being paid. Pitts-

burgh and middle western sellers are quoting plates and shapes at 1.40c to 1.45c, Pittsburgh, for first quarter, or 1.56c to 1.61c, New York, but such prices are usually made to regular consumers and there is no disposition shown to push them. Steel bars continue at 1.35c, Pittsburgh, for first quarter, or 1.51c, New York, with little tonnage offered for this year. Bar iron is 1.45c to 1.55c, New York, or 1.40c to 1.45c, eastern mill. Eastern billet makers are naming some prices for first half and have no difficulty to get $28.60 or higher, New York, equivalent to $26, Pittsburgh.

All the eastern district mills are producing at the top notch of capacity and indications point that the total ingot output of the country in October will attain the highest record in history. It is estimated that the steel production for the current month will reach approximately 3,000,000 tons of ingots. Favorable climatic and operative conditions usually render October the banner production month of the year. New enterprises in fabricated lines are of limited number at this season. The Hay Foundry & Iron Works has 2,000 tons for the Pierce-Arrow Garage, Long Island City; Ravitch Brothers, 1,000 tons for the Schiff Apartment, near 105th street and West End avenue; Adam Habbel, 700 tons for the Paterno Apartment at 104th street and West End avenue. Marc Eidlitz & Son have the general contract for the Cotton Exchange building, this city, and the 3,000 to 4,000 tons of steel is expected to go to the American Bridge Co. The American Bridge Co. has 300 tons for a bridge for the Erie railroad at Jersey City and a Cruishank warehouse at Horatio and Jansevort streets, this city, 1,500 tons, is up for bids. The Delaware & Hudson is inquiring for a power house at Oliphant, Pa., 500 tons. We quote, delivered at New York tidewater, as follows:

Plain structural shapes, 1.56c to 1.66c; tank plates, 1.56c to 1.66c; steel bars, 1.51c; common iron bars, 1.45c to 1.55c; steel bars from store, New York delivery, 2.00c; plates and shapes from store, 2.15c; extras as shown under Pittsburgh report.

Rails and Track Material.—Distribution of that portion of the preliminary rail order of the Pennsylvania system placed with the independent mills, which was referred to briefly last week, gives 30,000 tons each to the Pennsylvania and Cambria Steel companies, 10,000 tons to the Lackawanna Steel Co. and from 10,000 to 15,000 tons to the Bethlehem Steel Co. With the 50,000 tons placed with the Steel Corporation mills, this brings the total early order to 130,000 tons to 135,000 tons. Half of these rails are for rolling by April 1 and half by May 1. Supplemental orders, which the system will place later, will bring the tonnage to 200,000 to 250,000 tons. The St. Paul system, which has been inquiring for 80,000 tons for next year's delivery, will obtain this tonnage from makers in the Chicago district. The Erie railroad has placed 25,000 tons for next year with the Carnegie Steel Co. and a small tonnage with independent makers. The Maryland Steel Co. received 10,000 tons of the recently placed Atlantic Coast Line order. Other recent rail awards are: 5,500 tons for the St. Louis Southwestern railroad, and 2,500 tons for the Duluth & Iron Range, both to the Illinois Steel Co., and 2,500 tons for export to Brazil to the United States Steel Products Co.

Old Material.—New business in old material continues quite active and prices show strength. The brighter outlook is leading to considerable speculation and dealers are sometimes outbidding consumers for material. We quote, gross tons, prices New York dealers will pay at tidewater, as follows:

Old car wheels	$12.75 to 13.00
Old iron axles	21.00 to 22.00
Steel axles	15.75 to 16.25
Old steel shafting	15.00 to 15.50
No. 1 heavy melting steel	12.75 to 13.00
No. 1 R. R. wrought	14.00 to 14.25
Wrought pipe	10.25 to 10.75
Cast borings	8.00 to 8.50
Machine shop turnings	8.75 to 9.00
Heavy cast	11.00 to 11.50
R. R. malleable	11.00 to 11.50
Stove plate	8.50 to 8.75
Grate bars	8.00 to 8.50

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York.

ST. LOUIS

Southern Pig Iron Prices Strong

Office of THE IRON TRADE REVIEW,
St. Louis, Oct. 8.

Pig Iron.—Prices on pig iron have stiffened to such an extent that local agents have been forbidden by the furnaces they represent to make contracts except upon submission. The outlook could hardly be better for business, but the matter of shipments is a little blue, because of the reduction in stocks of iron. Upwards of a dozen concerns are asking for shipments before the time specified in their contracts. Southern No. 2 is strong at $14 to $14.50, Birmingham, for first quarter shipment, and one order for 1,000 tons of southern No. 2 was turned down by the furnace last week at a price of $14, Birmingham. At least two furnaces are holding firm at $14.50 for first quarter shipment. Northern iron is firm at $17, furnace, Chicago, and $16.50 to $17.50, Ironton. Prices follow:

Southern No. 1	$18.25 to 19.25
Southern No. 2	17.75 to 18.75
Southern No. 3	17.50 to 18.50
Southern No. 4	17.25 to 18.25

Coke. — The price is up on all grades of coke, and the demand for shipment is exceedingly strong. The situation is almost reduced to the question of "Can the coke be furnished?" regardless of price.

We quote 72-hour Connellsville foundry grades, $3.25 to $3.50 for immediate shipment or delivery through the year; 48-hour Connellsville furnace, $3.00 to $3.25; best 72-hour Virginia foundry, $3.25 to $3.30; 48-hour Virginia furnace, $2.50 to $3.00. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Finished Material. — Nearly every article in the finished line is in strong demand, with prices tending upward and deliveries difficult to make. Steel bars are quoted at 1.40c, Pittsburgh; plates at 1.50c, Pittsburgh; spikes at $1.90 to $2, Pittsburgh, and shafting at 60 per cent off the list price, base territory.

Old Material. — The market for scrap iron is still climbing upward, with an advance of $1 a ton on some items since last week, and a still further advance looked for before the close of the present week. The Missouri Pacific closed for 2,000 tons today; the Mobile & Ohio will have a list out Tuesday for 700 tons, and the Southern will put out one for 700 tons. Prices which dealers are willing to pay, f. o. b. St. Louis, follow:

Gross Tons.

Old car wheels	$15.50 to 16.00
Old iron rails	15.50 to 16.00
Rerolling rails (5 ft. and over)	14.50 to 15.00
Old steel rails (3 ft. and und.)	14.00 to 14.50
Light section relayers (45 lbs. and under, subject to inspec.)	24.00 to 25.00
Relaying rails, subject to insp.	24.00 to 25.00
Frogs, switches and guards cut apart	14.00 to 14.50
Heavy melting steel	14.00 to 14.25
Shoveling steel	13.00 to 13.50

Net Tons.

No. 1 railroad wrought	$13.00 to 13.50
No. 2 railroad wrought	12.50 to 13.00
Arch bars and transoms	15.50 to 16.00
Knuckles, couplers and springs	12.50 to 12.75
Shafting	17.00 to 17.50
Iron car axles	20.00 to 21.00
Steel car axles	17.50 to 18.00
Locomotive tires	13.50 to 14.00
Pipes and flues	9.50 to 10.00
Tank iron and cut boilers	9.00 to 9.50
No. 1 cut busheling	11.50 to 12.00
No. 2 cut busheling	9.50 to 10.00
Cast and mixed borings	7.25 to 7.75
Machine shop turnings	8.75 to 9.25
Railroad malleable	12.50 to 13.00
Agricultural malleable	10.50 to 11.00
Stove plates	10.00 to 10.50
Angle splice bars (iron)	13.50 to 14.00
Angle splice bars (steel)	12.50 to 12.75

BUFFALO

Pig Iron Strong—Supply Limited

Office of THE IRON TRADE REVIEW, Buffalo, Oct. 8.

Pig Iron. — The market is very strong. Prices were advanced again during the week to a new high level, which is being rigidly maintained. Placements during the week were nominal because there is virtually no more iron of any grade to be had for delivery over the remainder of the year and but little to be booked to fill the furnaces until the end of the second quarter of 1913. Malleable iron is very scarce and practically unobtainable. The indications are that before the 1913 season of navigation opens on the lakes, consumers will be replacing malleable pig with charcoal irons, because of the larger supply of the latter than the former. The demand for malleable has been far in excess of the provisions made by the furnaces for the making of this specialty. Railroad requirements have suddenly exhausted, to a great extent, the melters' capacity and now the low phosphorus ores are scarce.

The market has not as yet reached the state of urgency on prompt deliveries to call for premium offers, but the situation is expected. A large number of the stacks in the district have responded to the demands of the steel-making industries and are now making basic pig the major product. The Rogers, Brown & Co., Susquehanna furnaces recently sold to the Lackawanna Steel Co. fully 30,000 tons of molten basic iron, the plants being adjoining and the transfer easily accomplished. The furnaces are sold up to such an extent that a number of them are declining to quote on inquiries for considerable tonnage for delivery over the remainder of the year and into first quarter. The range for the week, f. o. b. Buffalo, is as follows:

No. 1X foundry	$17.00 to 17.50
No. 2X foundry	16.50 to 17.00
No. 2 plain	16.25 to 16.50
No. 3 foundry	16.25
Gray forge	16.00
Malleable	16.50 to 17.00
Basic	17.00 to 17.25
*Charcoal	18.75 to 21.25
*Some grades and brands	22.00

Old Material.—All of the dealers in the territory report a strong and active market as existing through the week, marked by considerable activity in practically all of the lines. The buying is from both within and outside of the district. More extensive trading in heavy melting steel, railroad wrought, malleable scrap, low phosphorus steel scrap and boiler plate, sheared, caused the advances indicated below in the following schedule of prices, f. o. b. Buffalo, for gross tons:

Heavy melting steel	$14.50 to 14.75
No. 1 railroad wrought scrap	15.50 to 16.00
No. 1 R. R. and mch. cast sc'p	14.00 to 14.50
Old steel axles	16.00 to 16.75
Iron axles	23.25 to 23.75
Car wheels	14.75 to 15.25
Railroad malleable scrap	13.75 to 14.00
Wr'ght iron and soft steel turn.	8.75 to 9.00
Cast iron borings	8.00 to 8.50
Low phosphorus steel scrap	17.00 to 17.50
Old iron rails	15.25 to 15.75
Tank iron	10.50 to 11.00
Boiler plate, sheared	15.00 to 15.50
Pipe and tank	10.25 to 10.75
Stove plate	11.25 to 11.75
Sheet iron	7.50 to 8.00
Locomotive grate bars	11.75 to 12.25

Will Build Works. — The Lackawanna Bridge Co. has been awarded the contract for fabricating the plant of the American Radiator Co., Acipco, in the city limits of Birmingham, Ala. The plant will be 250 x 900 feet and will be separated into foundry and finishing rooms for the manufacture of cast iron radiators.

BIRMINGHAM

Market Quiet, But Prices Firm

Office of THE IRON TRADE REVIEW, Birmingham, Ala., Oct. 8.

Pig Iron.—Within the past week some 4,000 to 6,000 tons, for reasonably prompt delivery, were sold to cover actual requirements in the southern territory. In this tonnage mentioned, a lot of 800 tons of No. 2 soft, for delivery through the first quarter, is reported sold at $14 per ton at Birmingham. For the remainder of the tonnage sold, it is not believed that lower figures than $13.50 at Birmingham were considered in any case, and that at such figures a longer period for delivery than the first quarter was granted. It is noted that the sales referred to represent the extent to which the several requirements have increased since previous engagements, rather than the anticipation of further advance. Such conditions are of course not overlooked by the selling interests, as a larger rate of consumption is indicated, as well as higher prices for the several foundry products. The inquiry for advanced requirements is being received in larger volume, but without encouragement from the furnace companies. These last are more interested in the delivery of the tonnage already sold, in which the shortage of cars and the scarcity of labor form quite a feature. Notwithstanding these last conditions, the aggregate stock was reduced some 8,000 tons in September. The market is quiet, but is no doubt correctly represented by the prices below for such delivery as is being solicited. Quotations for the remainder of the year and through the first quarter, are as follows, per gross ton, f. o. b. cars at Birmingham, viz.:

For delivery during the remainder of the year:

No. 1 foundry	$13.50 to 14.00
No. 2 foundry	13.00 to 13.50
No. 3 foundry	12.50 to 13.00
No. 4 foundry	12.00 to 12.50
Gray forge	11.50 to 12.00
Mottled	11.00 to 11.50
Standard basic	12.50 to 13.00
Off basic	11.00 to 11.50
Standard charcoal	22.50 to 23.00

With the exception of charcoal iron, an advance of 25c to 50c per ton would be asked over the above figures for deliveries in the last quarter.

Old Material.—This market has been very active for some 10 days past, and the movement has increased accordingly. Stove plate, and other light melting grades are now very scarce, and in some cases, premiums are being asked for the tonnage available. It is not understood that the tonnage of old car wheels mentioned as pending in the last report has been placed. The prices dealers are now asking for their holdings are revised as follows, per gross ton, f. o. b. cars here, viz.:

Old iron axles (light)	$15.50 to 16.00
Old steel axles (light)	13.50 to 14.00
Old iron rails	13.00 to 14.00
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.50 to 11.00
No. 1 country	8.50 to 9.00
No. 2 country	7.50 to 8.00
No. 1 machinery	10.50 to 11.00
No. 1 steel	10.00 to 10.50
Tram car wheels	9.00 to 9.50
Standard car wheels	12.00 to 12.50
Light cast and stove plate	8.50 to 9.00

Will Build 65-Ton Furnaces

The Republic Iron & Steel Co., Youngstown, will build two additional open-hearth furnaces at its plant at Youngstown, giving this company a battery of ten furnaces. The furnaces will have a capacity of 65 tons each, and will be completed within about six months.

METAL MARKETS

Copper Stocks Increase—Tin Prices Decline

New York

Oct. 8.

Copper.—Sales fell off noticeably the past week, buyers holding off pending the publication of the monthly statistics today. The producers' report shows that stocks increased 16,364,213 pounds, about double the amount generally expected. The addition to surplus metal, in first hands, was caused by the production of 140,089,819 pounds, and deliveries of 123,725,606. Domestic deliveries decreased 15,261,608 pounds and shipments for export decreased 10,220,356 pounds, compared with August figures. Stocks on Oct. 1 were 63,065,587 pounds. The market is altogether nominal today, at 17.75c to 17.87½c for lake and 17.50c to 17.62½c delivered 30 days for electrolytic.

Tin.—Supplies have come in freely since Oct. 1, and though nearby metal still commands a slight premium over cost to import, the local market has followed the declining quotations made in London. Spot sold at 49.50c on the New York Metal Exchange today. At the close of business there was a better demand for prompt metal, and 49.55c was bid.

Lead.—Business has been quiet at unchanged prices. The American Smelting & Refining Co. is quoting 5.10c in New York for shipments, and the independent sellers are asking about 5 points more.

Spelter.—Consumers give evidence of being fairly well supplied for immediate needs. Prime western is 7.60c in New York up to the end of the year.

Antimony.—The demand for antimony has been good and prices have been advanced to 10.12½c for Cookson's, 9.37½c for Hallett's and 9.20c for other brands.

Chicago

Oct. 7.

New Metals.—The market for new metals as a whole is stronger, although both lake and casting copper have fallen ⅛c below the prices prevailing a week ago. Pig tin and antimony continue to climb, Cookson's antimony being quoted at 10¼c today, as against 9⅝c a week ago.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 17⅝c; casting, 17⅜c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 7.55c; lead, desilverized, 5.05c; sheet zinc, 9c, f. o. b. Lasalle, in car lots of 600-pound casks; pig tin, 50.67c; Cookson's antimony, 10¼c; other grades, 9⅜c.

Old Metals.—The market for old metals is reflecting the strength apparent in iron and steel lines and manufacturers continue to do considerable buying. Some speculative buying is reported.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, crucible shapes, 15¾c; copper bottoms, 15c; heavy red brass, 13½c; heavy yellow brass, 10c; No. 1 red brass borings, 12¼c; No. 1 yellow brass borings, 9¾c; brass clippings, 10c; lead pipe, 4⅝c; zinc scrap, 5¾c; tea lead, 4⅜c; No. 1 aluminum, 20c; No. 1 pewter, 36c; block tin pipe, 46c; tin foil, 42c; linotype dross, 3¼c; stereotype plates, 4¾c; stereotype dross, 5c; prime slab zinc dross, $112 a ton.

COKE SHORTAGE

Is Serious With Buffalo Foundries—Other Troubles.

The coke situation with the Buffalo foundries is very serious. Many of the foundries in the district are on the verge of getting out of coke. The increased operation of the plants and the consequent increased demand upon the coke producers have found the latter not able to meet the needs of consumers. The foundrymen have required in excess of what the coke oven operators estimated would be sufficient to care for the market. Coupled with the inflow of orders for more coke the ovens have encountered serious difficulty in obtaining labor. In many cases, foundry stocks of coke have long since been exhausted and the plants are being operated by coke from cars to cupolas, and, with the increasing delays in the movement of freight, owing to the demands being made upon the roads in this territory, a number of foundries face the possibility of being compelled to shut down because of lack of fuel. The railroads are making heroic efforts to meet the situation, but they are now confronted with the heaviest traffic movement experienced in this section in years.

SHRINKING STOCKS

Continue to Reflect Market Activity Among the Furnaces.

Pig iron stocks on furnace banks in the central west continue to shrink on the average of about 25,000 tons monthly and in other sections of the country an equally favorable movement of accumulated iron is in evidence.

During the last half of September, the tonnage of pig iron in the hands of merchant makers and steel works interests in the Pittsburgh, valley, Ohio lake and surrounding territory was further reduced by 16,000 tons. This does not include the figures of the United States Steel Corporation, which, however, are being kept practically constant at a comparatively low figure. This makes the total reduction of iron stocks in that district in September about 26,000 tons, leaving the total on Oct. 1, approximately 480,000 tons. A great proportion of this tonnage is already under sale and the largest blocks in the district that remain to be marketed are those which through litigation or some other causes, cannot be offered at present. In other parts of the country, an equally favorable condition of iron stocks is to be observed.

Death of Wm. B. Jones

After an illness of more than a year from anaemia and nervous prostration, William B. Jones, former auditor of the Youngstown Sheet & Tube Co., Youngstown, O., died last Sunday at Dr. Searl's sanitarium in Cuyahoga Falls, O., where he had gone in the hope of obtaining relief. It was on account of his condition that Mr. Jones resigned as auditor at the expiration of the last fiscal year. He had been associated with the company ever since it began business and was auditor for a number of years. He also was interested financially in the company. Mr. Jones was born on Feb. 19, 1854, in Youngstown, where he spent his entire life. His father, Thomas Jones, was a furnace builder. He was held in high regard by all who came in contact with him.

New Steel Company Chartered

The Weirton Steel Co. has been chartered under the laws of West Virginia and will build a plant at Weirton, W. Va. E. W. Mudge, Pittsburgh, is among those interested in the new undertaking. Definite announcement concerning products to be manufactured, the size of buildings, etc., will not be made for a week or more.

Judge Gary Wanted Benefit of Frick's Advice

And For That Reason Consented to Purchase of Union Steel Co.—Corporation Not Anxious to Make the Deal

In the Steel Corporation hearing at Pittsburgh, reported fully through Monday's sessions on pages 688 to 695 of this issue, William H. Donner, president of the Cambria Steel Co., was recalled to the stand Tuesday and questioned by H. V. Colton in regard to the Donora Mining Co., which was organized about 1901. This company first acquired the Sweeney mine, on the Mesabi range, which was then known to contain about 500,000 tons. About 2,000,000 tons were developed later. For this property the Donora Mining Co. paid $100,000 in cash and agreed to pay a royalty of 25 cents a ton. It also agreed to pay 5 cents a ton to two parties interested in the mine, thus making the royalty 35 cents. The company later purchased the Penobscot mine and two ore vessels for $1,375,000, the vessels being appraised at $600,000. The mine contained 10,000,000 tons, half of which was Bessemer and half non-Bessemer ore. The company at the time of purchase expected to develop a larger tonnage. Mr. Donner said this was the wettest mine in the Hibbing district and that it required $25,000 worth of coal a year to operate the pumps alone. The witness then told about discovering the Little Mesabi mine in 1901. The company paid $10,000 on an exploration lease and agreed to pay a royalty of 25 cents. This mine contained about 10,000,000 tons. The company also leased the Volunteer mine, on the Cascade range, being given the privilege of purchasing the mine. The royalty was 50 cents, but no bonus was paid.

Mr. Donner was then questioned about the Lake Erie Terminal Railroad Co. He stated that the Mellens, of Pittsburgh, purchased a site at Elk Harbor, on Lake Erie, and this was considered an admirable location for a railroad terminal, as well as for building a town. The railroad was to connect with various points in the valleys.

Farrell Did Not Object

Mr. Donner was asked about the contract which was drawn up between the United States Steel Corporation and the Union Steel Co. at the time the former took over the latter. One clause stipulated that none of the parties interested in the Union company was to re-engage in the manufacture of iron and steel products in this country and Canada, with the exception of Arizona and Florida. Mr. Donner stated that prior to his accepting the presidency of the Cambria Steel Co., he went to see President James A. Farrell, of the Steel Corporation, about a month ago, to see whether the latter had any objection to this step. Mr. Farrell told Mr. Donner to go ahead.

In cross examination by Mr. Lindabury, the witness was questioned in regard to the sale of the Union Steel Co. to the Steel Corporation. Asked if the Steel Corporation seemed very anxious to consummate this step, he stated that this was not the case. H. C. Frick, in fact, had been afraid that the sale could not be effected. It followed only after the properties of the Union Steel Co. had been thoroughly looked over.

Some Inside History

Mr. Lindabury asked the witness to relate the various events connected with the sale of the Union Steel Co. to the United States Steel Corporation. The first overtures were made by Mr. Frick, and these were unfavorably received by at least three of the officials of the Steel Corporation, Messrs. H. H. Rogers, Reed and Judge Gary. Judge Gary later told Mr. Donner that he would not have given his consent to the purchase, had he not been desirous of retaining the benefit of Mr. Frick's advice and counsel in the Steel Corporation. Mr. Donner said he was glad of the sale as he was thus able to get himself out of debt.

Mr. Donner stated that the Union Steel Co. asked $10,000,000 for the ore properties belonging to the Donora Mining Co., but received $1,500,000 less than this. The 3,212 acres of coking coal, belonging to the Republic Coke Co., it sold for $2,880,000.

Mr. Donner said that an "integrated" company, that is, one owning its ore, coal and other raw material supplies, as well as its own ore fleet, blast furnace and steel works, was in a more favorable position than a company not so "integrated". In a reply to Mr. Lindabury, he said that several of the independent companies are "integrated" to such an extent that they are all on an equal basis with the Steel Corporation as competitors. Those companies are all able to sell at equally low prices.

The witness said that the owners of the Union Steel Co. made a profit of $360,194.81 by selling the River Coal Co., $1,665,418.41 by selling the Republic Coke Co., and $3,079,864.77 by selling the Donora Mining Co. to the Steel Corporation.

A. R. Kennedy, traffic manager of the Pittsburgh Steel Co., Pittsburgh, testified that the difference between the freight rates on "direct" and "indirect" ore is 8 cents. "Direct" ore is that which is loaded directly from the ship to the car at lower lake ports. "Indirect" ore is that which is loaded from the ship into docks and then into cars.

Districts Defined

Asked to define the Youngstown district, he said it included Newcastle, Pa., to the east, Warren, O., to the west, and Shenango, Pa., to the north. Some of the points he mentioned as being in the Youngstown district were Sharpsville, Wheatland, West Middlesex, Niles, Sharon, South Sharon, Girard, Brier Hill, Haselton, Struthers, Powellville, Newcastle, Warren, Shenango and Youngstown. He stated that the ore consumption of this district, calculated on the basis of full capacity, is 9,600,000 tons annually.

The Pittsburgh district he defined as including Neville, Pittsburgh, Braddock, Duquesne, McKeesport, Clairton, Monessen, Kittaning, Donora and Aliquippa. The consumption of ore annually in this district, based on full capacity, is 15,000,000 tons.

The Wheeling district, Mr. Kennedy said, includes Steubenville, Mingo Junction, Martin Ferry, Bellaire, Benwood and Wheeling. The annual ore consuming capacity of that district is 3,200,000 tons.

Columbus, O., Mr. Kennedy said, has an annual ore consuming capacity of 700,000 tons; Ironton, O., 500,000 tons; Josephine, Pa., 600,000 tons; Ashland, Ky., 100,000 tons, and Jackson, O., 60,000 tons.

Mr. Kennedy's examination was halted here, to be resumed on Wednesday.

It is expected that the hearings will be adjourned on Friday for several days, after which they will again be held in Pittsburgh for another week or two.

FINISHING MILLS

Of Corrigan, McKinney & Co. to be Erected by American Bridge Co.

Corrigan, McKinney & Co., Cleveland, have let a contract to the American Bridge Co. for the construction of the mill buildings for the company's proposed steel works on a site across the Cuyahoga river from its blast furnaces. The contract involves 17,000 tons of structural material. Corrigan, McKinney & Co. will lay out their mill equipment and the American company, under the contract, will construct all the buildings to house the machinery, open-hearth furnaces, etc., drawing the plans therefor also.

Tentative plans for the steel works provide for the immediate construction of eight open-hearth furnaces of 75 tons capacity each, provisions being made for four additional furnaces to be built as needed. A 600-ton mixer will be installed. The rolling mill equipment will include a blooming mill, combination rail, billet and sheet bar mill, together with a structural mill and three merchant mills, which will probably be 8, 11 and 16-inch mills. The projectors have not as yet determined definitely the actual mill equipment, but so far as determined it would appear to follow the lines above indicated.

The firm is now negotiating with Cleveland municipal authorities for right to build a hot metal bridge across the Cuyahoga river, from its two blast furnaces to the mill site opposite. The firm proposes to build a bridge with a river passage way of 120 feet in the clear, but the city insists upon a clearance of 150 feet and this matter is still being negotiated, this having a tendency to delay somewhat the plant construction. The construction of foundations for the mill building and machinery will begin this winter, to the end that building construction can be undertaken in April. The company is planning to make steel in April, 1914. The capacity of the works is roughly estimated by its projectors at 400,000 tons of steel annually.

Spanish Ore Trade

Concerning the Spanish ore trade, the Middlesbrough, Eng., correspondent of the *Iron and Coal Trades Review*, says:

"There is little to report in the foreign ore trade this week. Sellers are very firm on the basis of 23s for best Bilbao rubio of 50 per cent quality, ex-ship Tees. But large consumers are still comfortably situated, and no transactions of note are reported."

IMPORTANT INQUIRIES

For Steel Pipe—Leading Interest Advances Blue Annealed Sheets.

Pittsburgh, Pa., Oct. 9. (By wire.)—Several important inquiries for steel pipe came out yesterday afternoon and more than 150 miles are involved in pending negotiations. One interest is in the market for 75 miles of 16-inch pipe for shipment to Ohio points. Another interest is negotiating for about 70 miles of 4-inch pipe. It is also reported that there is pending an indefinite inquiry for 50 miles of line pipe. Several days ago it was reported that a Canadian interest was in the market for eight miles of 8-inch pipe. This inquiry has been withdrawn.

Active buying in pig iron continues. This morning another sale of basic is reported at $16.25 valley furnace. About 5,000 tons are involved in this transaction. Particulars regarding shipments are not given. Inquiry for all grades is good. About 10,000 tons of next year's Bessemer is a new inquiry reported today. Many claim that $16.25 is a minimum on basic, foundry and malleable. Bessemer seems to be fairly well established at $17, valley.

The leading interest has advanced blue annealed sheets $1 per ton and is now quoting $1.60 for No. 10 gage. The last previous advance was in August. A number of independent mills have been quoting $1.60 for No. 10 gage for several weeks. The demand for all grades is heavy and an early advance on black and galvanized sheets is expected.

Advance Pump Prices

The International Steam Pump Co. has announced an average advance of about 5 per cent on all its lines of products. The company states that this is "the first step towards emergence from the recent era of excessively low prices" because of the growth in volume of new orders and "the character of the inquiries for new business."

Furnace Disabled

A cave-in of the lining of the Crane No. 1 furnace at Catasauqua, Pa., recently has temporarily put that stack out of commission. About six weeks will be required to make the necessary repairs. The furnace was running on low phosphorus iron at the time of the accident.

PROFITS FALL

English Company Suffers Through Labor Disputes.

At the annual meeting of Bolckow, Vaughn & Co. at Manchester, Eng., it was stated that the profits were £209,000, being a fall of about £80,000 compared to the previous year. The reduction was solely due to labor difficulties, especially the coal strike of last spring and the railway strike in August of last year. The chairman of the company, Sir J. E. Johnson Fergusson, said that, but for the strike, production of steel would have been largely in excess of that of the previous year. The chairman mentioned the fact that at last year's meeting Cleveland iron had fallen to 46s 6d ($11.38), at which price it had to be made at a loss. During the past few weeks it had advanced to 67s ($16.40) or more. At these prices they hoped to recoup themselves for some of their losses during the strike. The chairman gave a great number of examples of small strikes, and remarked that, when there were important principles at stake, he did not complain of men striking, but employers had legitimate grounds of complaint when men abandoned their work on frivolous grounds without making any attempt to have their complaints dealt with or inquired into through the recognized channels. If men persisted in acting in that manner it could not but prove disastrous to the general trade of the country, and in the long run none would suffer so much as the men themselves. A remarkable feature of the meeting was that a sum of £1,000 was placed at the disposal of the directors for the purpose of assisting religious, charitable, and other institutions situated in the neighborhood of the various properties of the company.

President Burden Injured

James A. Burden, president of the Burden Iron Co., Troy, N. Y., and vice president of the Eastern Steel Co., suffered a broken collar bone while playing polo near Westbury, L. I., Oct. 6. Mr. Burden fell from his pony as he attempted to strike the ball.

Heinrich Koppers, of Essen-Ruhr, Germany, founder of the by-product coking system bearing his name, and president of the H. Koppers Co., Chicago, arrived in the United States last week to look after his interests in this country.

How Molds Are Made for Heavy Steel Castings

The Use of a Skeleton Pattern for Molding a Heavily Ribbed Annealing Box—Practice of the Hubbard Steel Foundry Co.

In making large steel castings weighing five tons and over, especially where only a few pieces of one kind are required, the expense involved in making large wooden patterns is frequently burdensome to the foundryman and to his customers. Progressive steel foundry superintendents devote considerable attention to the problem of reducing pattern expense in the production of large castings by means of sweeps, skeleton patterns, specially constructed core boxes and other devices. Also, if large molds are made in flasks in the usual manner and are rolled over with a crane, the labor involved is often excessive, to say nothing of the risks incurred in rolling over a heavy mold. To obviate this, considerable thought is being devoted to methods of molding which will not only save pattern expense but will also avoid handling the heavy flasks. Some typical large jobs involving these principles have recently been executed by the Hubbard Steel Foundry Co., East Chicago, Ind., the details of which will be discussed in this article.

Figs. 1 to 3 illustrate a method of molding the large cast steel annealing box shown in Fig. 4, by the use of a collapsible core box and skeleton pattern instead of a solid pattern. In molding annealing boxes by the ordinary method, not only is the pattern expense excessive, but considerable difficulty is frequently experienced in drawing the pattern from the mold, and the large green sand core and sides of the mold in the cheek are often badly torn, necessitating a large amount of patching. The annealing box illustrated, is 180 inches long, 49 inches wide and 75 inches high inside. The metal is 2 inches thick and the casting weighs 20,000 pounds.

Method of Molding

In the method used at the Hubbard steel foundry, the annealing boxes are molded in a three-part flask consisting of a drag, *D*, Fig. 3, a cheek, *C*, and a cope, *P*, Fig. 1. The flask is 18 feet long and 7 feet wide and is made of cast steel in sections, as shown in the illustrations. The sections are each 18 inches deep. One section is used for the drag, three for the cheek and one for the cope.

In making the mold the drag is first placed on the floor and properly leveled, after which it is filled with sand and rammed to form a bed for the mold. Then the collapsible core box, Fig. 2, is set upon the drag, filled with sawdust and sand and rammed, forming the large green sand core, *R*, Fig. 3. The core box consists of two sides and two ends fastened together by four bolts as indicated in Fig. 1. It is roughly, but heavily constructed and thoroughly braced to withstand hard usage. Two rows of ¾-inch holes, *H*, Fig. 2, are drilled through the sides of the core box at each end. The through bolts, *S*, which hold the end pieces in place, pass through these holes and are, therefore, adjustable for a length of about 3 feet at each end of the core box. This permits the same sides to be used for making castings of different sizes, narrower or wider end pieces being employed, as the case may be.

After the green sand core is properly rammed the core box is removed by taking out the bolts which hold the sides and ends together. The ribs on the casting, *I*, Fig. 4, are formed by loose patterns embedded in the core, as indicated at *N*, Fig. 1.

After the core box has been removed, pattern boards similar to the one shown at *A*, Fig. 2, are placed against the sides of the core to provide for the proper thickness of metal in the sides of the casting. The boards have considerable draft so they will come out of the sand easily. The pattern boards being in place, the cheek is lowered over the center core by a crane until it rests

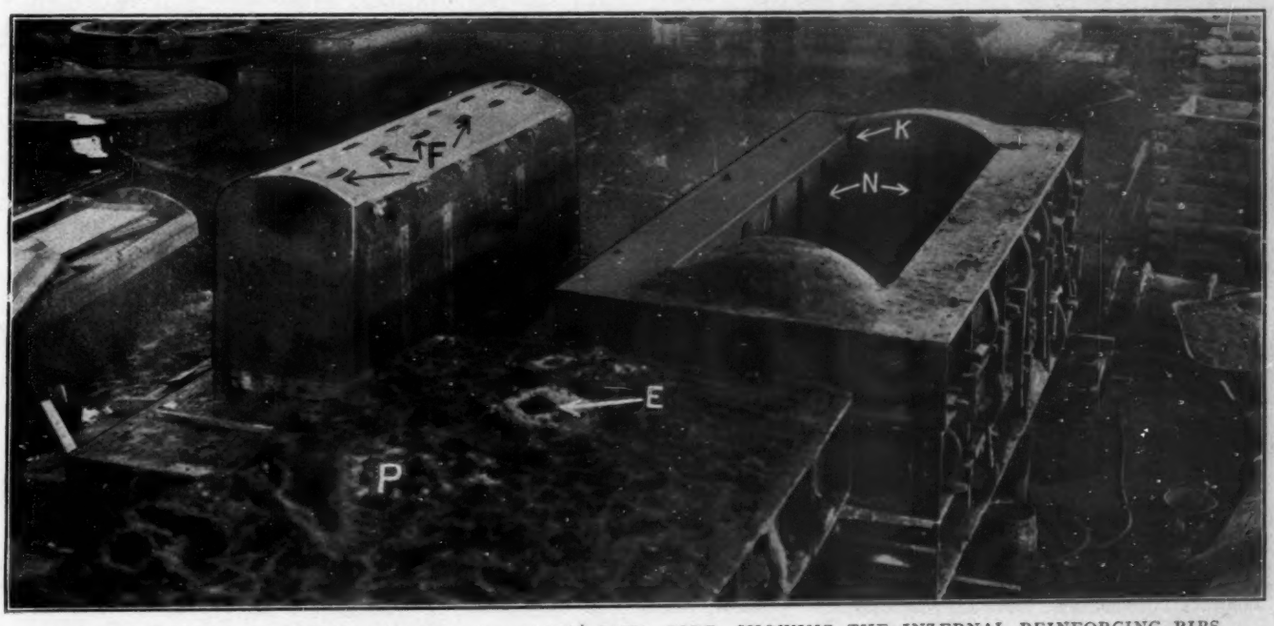


FIG. 1—INTERIOR OF CHEEK AND TOP OF GREEN SAND CORE, SHOWING THE INTERNAL REINFORCING RIBS

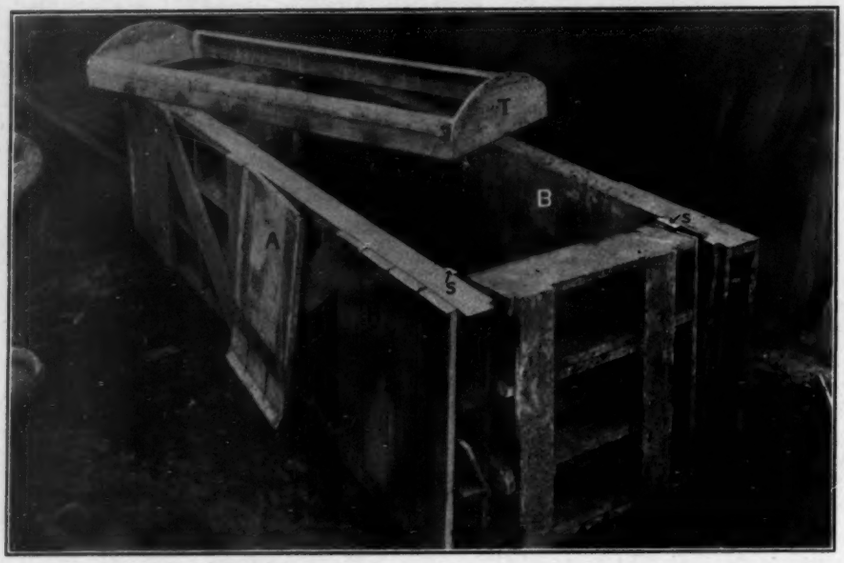


FIG. 2—ADJUSTABLE CORE BOX AND SKELETON PATTERN USED FOR MOLDING THE CAST STEEL ANNEALING BOX

FIG. 3—ANNEALING BOX MOLD WITH CHEEK REMOVED

FIG. 4—TEN-TON CAST STEEL ANNEALING BOX

on the drag in the proper position. The cheek is then rammed, the sand being carefully tucked against the sectional pattern boards.

When the cheek is finished the cope is set in its proper position and the cope pattern, *T*, Fig. 2, which forms the dome of the annealing box is set in place. This pattern is shown in its skeleton form in the illustration, but before the cope is rammed the space over the top is filled by removable strips which have prints fastened to them for making the impressions of the reinforcing ribs shown along the top of the core at *F*, Fig. 1. The cope is properly provided with bars and the sand is rammed with air rammers. After the cope has been finished it is lifted off the mold by the crane and is placed on high horses for drying. The cheek is then removed and the mold is in the condition shown in Figs. 1 and 3. The various parts of the mold are then finished and dried, after which the flask is clamped and weighted for pouring. The large green sand core consists of a sawdust center through which the gases pass freely, with a 2-inch facing of molding sand on the outside.

Pouring the Mold

The metal is poured through a single runner, *E*, Fig. 1, placed at the end of the mold. It extends down through the cheek into the drag. Gates cut in the drag lead the metal from the lower end of the runner to each side of the mold. Similar gates are cut in the cheek as indicated at *K*, Fig. 1, to provide hot metal at the top and relieve the strain. There is a large riser at the opposite end of the flask.

The mold is made by seven men, there being four molders and three helpers. Two days are required, there being 72 hours of molding labor and 54 hours of helpers' labor on the job.

Cast Steel Soaking Pit Cover

Fig. 5 shows a mold for a cast steel soaking pit cover made for a new steel plant now under construction in Minnesota. The finished casting, which weighs 14,000 pounds, is illustrated in Fig. 7. The casting is 2 inches thick and 10 feet square. As indicated, it is divided diagonally by split cores into four sections. The sections are split apart after the casting is finished and are then bolted together through the flanges, *G*, Fig. 7. The casting is divided in this manner to take up the enormous expansion stresses generated by ex-

cessive heating and cooling when the cover is in use over a soaking pit. The covers, however, are shipped to the steel works in one piece. The various sections will not be split apart immediately, it being expected that the cover will remain in one piece for some time after it goes into service. Eventually it will crack along the split cores.

Molding the Soaking Pit Cover

The flask, illustrated in Fig. 5, consists of two 18-inch cast steel sections, 12 feet square. A solid pattern is used and it is bedded into the sand to avoid rolling the flask over. After the pattern has been drawn from the sand the mold is thoroughly oven dried. It is then taken back to the floor and the split cores, chaplets, etc., are set as indicated in Fig. 5.

No cope is used. Instead, four dry sand slab cores, shown on the truck in Fig. 6, are employed to cover the mold. Each core is approximately 5 x 4 feet in size and 10 inches thick. The cores rest on the shoulder shown around the edge of the mold in Fig. 5. They also bear on the chaplets placed in the face of the mold and, in addition, are supported from the top by rods. A runner extends up through the cores at the exact center of the mold. The lower end of the runner communicates with four gates which lead to the four corners of the casting.

In making this mold, 36 hours of molding labor and 18 hours of helpers' labor are required to bring the drag to the condition shown in Fig. 5. An additional 18 hours of molders' labor and nine hours of helpers' labor are necessary to prepare the dry sand cores and finish the job. The casting is poured with open-hearth steel ranging from 0.27 per cent to 0.35 per cent carbon.

Cast Steel Blast Furnace Hopper

Another interesting mold for a heavy casting is illustrated in Figs. 8 and 9, the former showing the cope and the latter the drag. The casting weighs 9,000 pounds, the metal being from 2 to 3 inches thick. The casting forms half of a hopper receiver for the top of a blast furnace, the two halves being bolted together by deep flanges, one of which is indicated in the drag mold at *X*, Fig. 9. A conical hollow pattern is used, the lug shown on the side of the hanging core being formed in the drag by a separate, detachable piece.

The flask is 12 feet long and 7

FIG. 5—MOLD FOR SOAKING PIT COVER WITH SPLIT CORES IN PLACE

FIG. 6—SLAB CORES USED TO COVER THE MOLD SHOWN IN FIG. 5

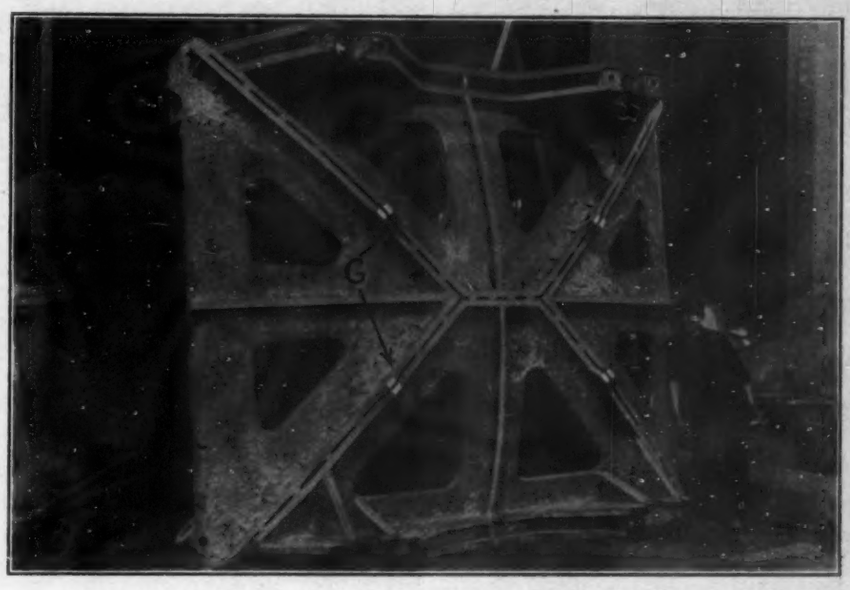


FIG. 7—CAST STEEL SOAKING PIT COVER WEIGHING SEVEN TONS

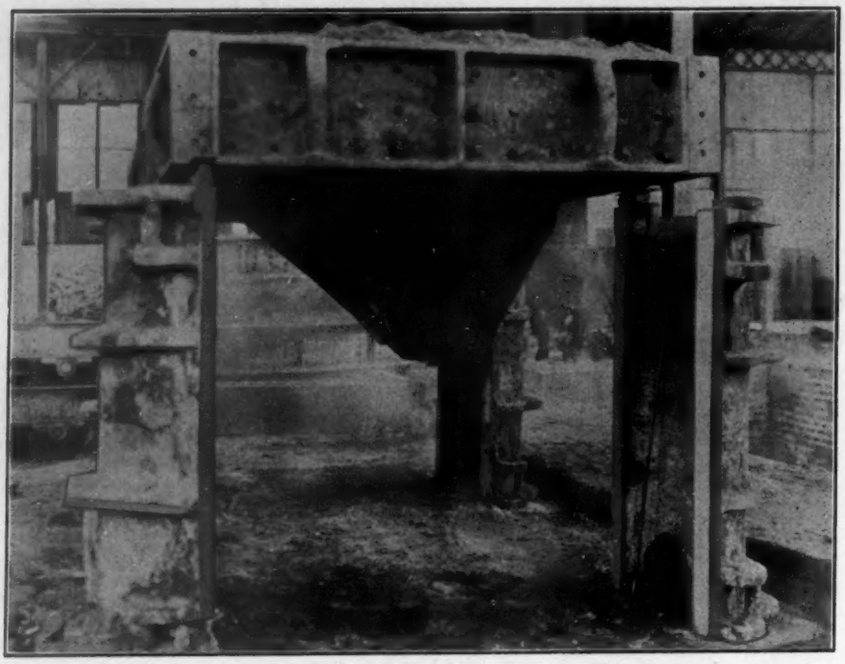


FIG. 8—COPE FOR A BLAST FURNACE HOPPER RECEIVER MOLD

feet wide, the drag consisting of two 18-inch sections. The drag is not rolled over, the pattern being bedded into the mold. After the drag is rammed, the cope is placed on top, filled with sand, rammed and removed in the usual manner. The hanging green sand core illustrated in Fig. 8 comes out with the cope. The sand composing the core is held in place by bars properly shaped and also by gaggers. After the cope is removed the pattern is drawn from the drag and the latter is nailed, finished and dried. The cope is dried with charcoal.

The metal enters the mold through a runner in the side of the drag, as indicated at *Z*, Fig. 9. The metal is fed from the runner into the mold through two sprues which connect with the lower edges of the deep flange. Three 8½-inch shrink-heads are placed in the cope around the periphery of the mold.

Two molders and one helper require three days to make one mold, there being 60 hours of molding labor and 18 hours of helpers' labor.

Sulphur is being used in Philadelphia as a cementing material in which to set the trolley posts of street car lines. These posts were formerly corroded greatly by electric currents and electrolytes in soil moisture, but the sulphur, being itself an insulator and being waterproof, appears to protect the iron and makes an excellent cementing material. It is quite possible that sulphur may find much more extended use to preserve iron from the effects of electrolysis.

Mine Production in Central States

The United States geological survey has recently published, as an advance chapter from Mineral Resources of the United States for 1911 a report on the mine production of silver, copper, lead, and zinc in the central states in 1911. The total value of the output of these metals in the central states in 1911 was $64,519,444, nearly half of which came from Missouri, whose production was valued at $30,171,311. The value of the output of Michigan, the second largest producer, was $27,743,572.

The output of copper from the central states in 1911 came from the states of Michigan and Missouri and amounted to 220,480,513 pounds. Of this production 219,840,201 pounds came from Michigan.

The mine production of lead in the central states in 1911 was 188,669 short tons, which, rated at the average New York price for the metal for the year ($90 a ton), was valued at $16,980,210, compared with 171,226 short tons, valued at $15,067,888, in 1910. Missouri produced 95 per cent of the yield of the central states and about 44 per cent of the primary lead recovered in the United States from domestic ore.

The production of zinc in the central states in 1911, based on mine returns with a deduction for separating and smelting losses, was 172,698 short tons, valued at $19,687,572; the production for 1910 was 178,784 short tons, valued at $19,308,672. Missouri was the largest producer of zinc in the United States, although its production, 122,515 tons, was slightly less than in 1910.

A noteworthy fact shown in the report is that while the amount of zinc concentrates produced in the upper Mississippi valley region was 110,009 short tons, or about 40 per cent of the 268,670 short tons produced in the Joplin district, the value of the former was only $2,324,072, or not quite 23 per cent of the value of the Joplin output ($10,217,993). This difference is accounted for by reason of the higher grade of ore that is produced in the Joplin district.

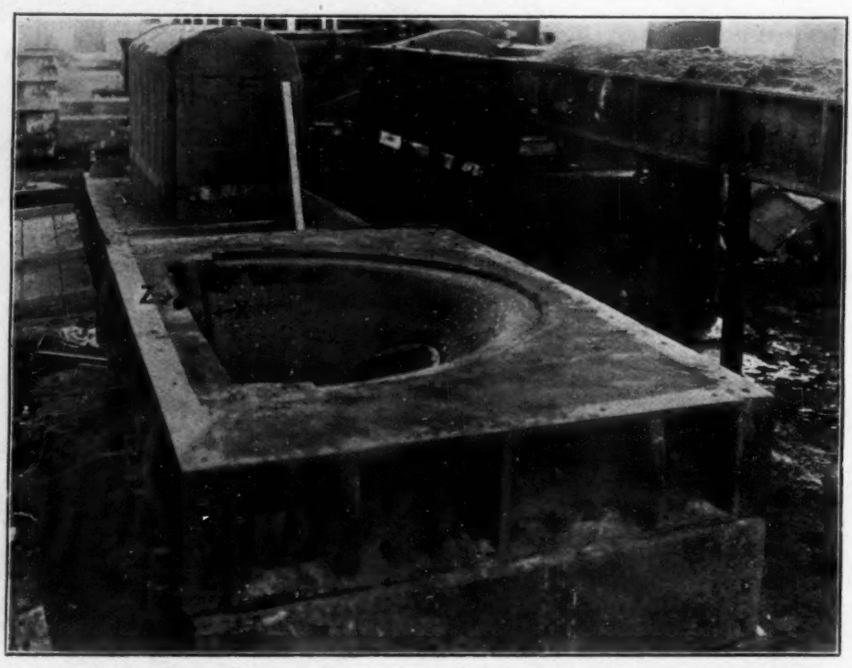


FIG. 9—DRAG OF THE MOLD, SHOWING THE WING FLANGE AND RUNNER

The Eight-Hour Shift in the Steel Foundry[1]

The Economic Features of the 12-Hour and 8-Hour Shifts in Open-Hearth Furnace Work

By R A Bull

It will doubtless be granted that, on account of recent agitation concerning the long hours of employment almost universally obtaining in certain departments of steel works and blast furnaces in the United States, a frank discussion of this question in the sessions of this association, whose membership includes many steel founders who employ the 12-hour shift on their furnace platforms, is in order at this particular time.

Congressional Inquiry

You are aware of the public attention now being given to this question, partly through articles which have appeared in the popular magazines, and more especially because of congressional inquiry. Certain leaders in the world of iron and steel have lately testified before the senate committee concerning the necessities for continuous operation of steel and blast furnaces requiring attention of attendants for every hour of the day for every day of the week, and have endeavored to describe the nature of the duties devolving upon these men. I am frank to say that the testimony given upon the latter point by some captains of industry has amused me, as it doubtless has many others, by its mis-statement of facts, possibly due to incorrect knowledge of working conditions.

As employers of labor, we must look this question squarely in the face, realizing, if we do not understand as well as a layman may, the nature of work we require of men for 12 hours per day for seven days of the week, it is high time that we fully inform ourselves, and further, that having ascertained those facts, we will by no means benefit ourselves by attempting to disguise conditions.

The question of the long shift, as it concerns the foundrymen, crystallizes into a consideration of the melter and his furnace helpers, and has to do with the steel foundry. I assume it to be unnecessary to set forth in any sort of detail the nature of the steel-maker's occupation. The work is distinctly arduous, physically and mentally, carries a responsibility which puts a man's nervous system in frequent high tension, and is especially trying on the physical system during the summer months. It can, however, be truthfully stated that the difficulties of the work are not constant but periodic, also that the Sunday shift in the steel foundry (not necessarily in the steel mill) is a very easy one. A furnaceman may have a considerable interval of comparative relaxation, when his furnace and heat respond nicely to his manipulation, and weather conditions prevail which do not make the working temperature a hardship. And again he may, in spite of all the experience and skill at his command, have about as trying and exhaustive a day's work, without intermission and for several days in succession, as one can readily imagine. This latter fact being admitted, one can understand why our legislators are putting the furnaceman's occupation under scrutiny, in the interest of humanity. It may be claimed, and with some degree of truth in certain instances, possibly, that all of this interest has not been stimulated by humane motives, but for political reasons. But, disregarding the ulterior motives of the ever-present demagog, and analyzing this question conservatively, it must be apparent to us that a few more years may see legislation honestly conceived that will put an end to the 12-hour shift for the steelmaker.

Opposed to the 12-Hour Shifts

This paper does not purport to deal with the humanitarian side of the issue. But without stating in brief my own convictions, it might be claimed that I evade that phase of the question. Not wishing to invite such a criticism, at the risk of being superficially regarded as voicing an opinion, which, if maintained by those of greater influence than myself, should be cried down as inimical to large and important iron and steel interests, I do not hesitate to state my belief in the absolute injustice, humanely speaking, of the 12-hour shift on the furnace platform. I trust that I shall not be classified as a Socialist for having such a conviction. The question must be decided neither from the viewpoint of the plutocrat nor that of the walking delegate, and I claim to have formed my conclusions after consideration of the question from a conservative standpoint, and after many years of personal observation of working conditions surrounding the furnaceman's work. Furthermore, to offset any suggestion of bias, let me say that I do not now hold, and never have held, a union card, active or honorary, issued by any labor organization.

The 8-Hour Shift Instituted

The company with which I am associated some time ago inaugurated three 8-hour shifts as applying to the furnace and boiler crews, both of which had previously worked 12-hour turns. It had been my opinion, and that of my immediate superior, that such a revision of our working schedules in these departments would be accompanied with so much more efficient handling of the furnaces that if the rates per hour were reasonably increased to remove the natural disinclination of the men to receiving only two-thirds of their former monthly income, the final result would show economy. This was the purely business side of the question, whose humanitarian aspects received our first consideration. A careful adjustment of wages was planned which yielded an increase per hour of 22 per cent to the first helpers, 18 per cent to the second helpers, and 16 per cent to the third helpers. Even the door boy was included in the scheme, and was to receive an advance of 19 per cent per hour. The boiler firemen were to be increased 19 per cent per hour, and the coal passers 14 per cent. It should be borne in mind that none of the men affected had asked for a change in the shift hours, or an increase of wages, nor had any plant in our vicinity any such change in contemplation.

Permission of our principal executive officers was obtained to inaugurate the new plan, and when it was put into effect, it came as a glad surprise to the various crews. No inducements were offered them to render more efficient service, nor was

[1]Presented at the Buffalo meeting of the American Foundrymen's Association.

any suggestion made that we proposed to keep comparative data. But it was an easy matter to make comparisons because we had a meter registering within one-half of 1 per cent of accuracy by careful test, on each open-hearth furnace line to record the fuel oil consumption, a magnetic recorder to indicate the frequency with which the furnace burners were reversed, a system by means of which all extra pig iron used in each heat was weighed and recorded, a recording pressure gage to show the steam pressure maintained in the boiler room, and finally the chemical analyses and physical tests customarily made for every heat to determine the relative qualities of the product.

Comparative Economies of the 8 and 12-Hour Shifts.

Open-Hearth Furnaces.

	Twelve-hour shift.	Eight hour shift.
Average amount of extra pig iron charged per heat, pounds	556	424
Average amount of fuel oil consumed per heat, gallons	1,275	1,138
Average amount of fuel oil consumed per ton of metal charged, gallons	55	49
Average number of cracked castings per heat, per cent	0.49	0.37
Average of longest intervals between reversals of burners during 12-hour periods, minutes	28	26.7
Average of chemical analyses of all heats:		
Carbon, percentage	Correct	Correct
Phosphorus, per cent	0.011	0.011
Sulphur, per cent	0.022	0.022
Manganese, per cent	2 pts. under	Correct
Silicon, per cent	1 pt. over	Correct
Maximum phosphorus in any heat, per cent	0.022	0.018
Maximum sulphur in any heat, per cent	0.025	0.025
Average physical tests of all heats:		
Yield point per sq. in., per cent, over	13.0	15.5
Tensile strength per sq. in., per cent, over	5.9	5.8
Elongation in 2 in., points over	4.6	4.1
Reduction of area, points over	7.9	7.2
Minimum physical tests of any heat. (Not combined results of one bar, but individual minimums of results covering all bars.):		
Yield point per sq. in., per cent, under	2.5	7.7over
Tensile strength per sq. in., per cent, under	4.7	1.4
Elongation in 2 in., points under	5	3
Reduction of area, points under	8.3	7.6

The term "point" means a hundredth of one per cent where analyses are referred to, and elsewhere 1 per cent, but in all cases it refers to differences from works standard, being found by simple subtraction. In no case does it indicate relative or proportionate results. Where such are shown they are indicated by "per cent" followed by "over" or "under". "Over" and "under" mean respectively results more or less than those desired by plant requirements, and we have no references to A. S. T. M. standard specifications, the requirements of which are fully met in all the minimum results obtained under the 8-hour shift. "Correct percentage" means exactly the composition desired, lowest possible content of phosphorus and sulphur demanded by plant requirements.

Boiler Room.

	Twelve hour shift.	Eight hour shift.
Number of times when steam pressure fell below 110 pounds	77	42
Number of times when steam pressure fell below 105 pounds	9	3
Number of times when steam pressure fell below 100 pounds	1	0

Operating Expense for Boiler Room Labor.

On 12-hour shifts, from 6 a. m. to 6 p. m., one head fireman, two second firemen and two coal passers were employed; and from 6 p. m. to 6 a. m. one head fireman, one second fireman and one coal passer, at total expense per day of 24 hours of $19.50. On 8-hour shifts, from 7 a. m. to 3 p. m., one head fireman, one second fireman and two coal passers were employed; and on each of the other two shifts one head fireman, one second fireman and one coal passer were employed, at a total expense per day of 24 hours of $19.12, or 38 cents less per day of 24 hours divided into three 8-hour shifts, despite the increased wages per hour.

Before studying the comparative record, permit me to state for your more intelligent consideration of the various showings, a few important facts. The first four weeks prior to the change, and the first four weeks following, were taken as those best for comparison, because working conditions for these two periods were as nearly identical as could readily be found in our plant. The melting stock, the fuel oil and the boiler coal were of uniform quality throughout, so far as the same grades or brands of these materials may possibly be. The demand made upon each 250-horsepower boiler under fire was practically the same in each case, the air load being steady, but the electrical load extremely intermittent for the entire eight weeks, a chronic condition which in our case militates greatly against a desired uniformity of 125 pounds of steam pressure. The practice on the open-hearth platform had obtained for years of reversing the burners every 20 minutes when a furnace was charged, and every 30 minutes when empty. It was, of course, the object to make the least possible additions to the percentage of pig iron charged, and the furnacemen were required to exercise such judgment in this respect as would keep the amount of extra pig within reasonable bounds, and as low as possible. Naturally they were also expected to keep the burners nicely adjusted and to maintain the proper temperature of the bath at the lowest possible oil consumption.

The furnaces were basic, and 47,000 pounds of metal were charged per heat. The shift hours under the old plan had been from six to six; under the new arrangement they are from 7 a. m. to 3 p. m., 3 p. m. to 11 p. m., and 11 p. m., to 7 a. m., these being the most convenient because of local conditions. The crews change their shifts the first day of each week, thus giving every three weeks, the full daylight turn to each crew. Having made the above points clear, I will refer to the accompanying comparative record, which contains certain results not shown as actually found, but indicated in a manner sufficient for ready comprehension.

Gratifying Results of the 8-Hour Shift

It will be readily understood that we were greatly gratified at the comparison, which indicates a more economical and efficient manipulation of both open-hearth and boiler furnaces. It will be observed that the differences in most cases are slight, but the pleasing and important feature is that the essential ones are in favor of the short shift. If we had had suitable means of weighing our coal as it was stoked, we could have elaborated our boiler room records, for we had on our boiler line a water meter, and on our feed water heater a thermometer, to indicate the evaporation. But we did not have at hand convenient facilities for exactly determining our coal consumption.

It was not to be expected that the greatest improvement would take place immediately after the change, and had all working conditions been some months afterwards practically the same as they were previous to the adoption of the 8-hour shift, there could have been made a fairer comparison. Certain important working conditions having changed, it was advisable to compare periods as indicated. But it is interesting to know that in those instances where conditions remained constant there was a noticeable improvement the second month as compared with the first month after the new schedule was in force, as, for example, the reduction in the average amount

of extra pig iron charged per heat, from 424 to 137 pounds.

I do not know if any such comparisons as those made the basis of this paper have heretofore been made in a similar fashion. It is quite possible that the idea has some degree of novelty in certain of its details, for, notwithstanding the criticisms recently directed against the 12-hour shift, its prevalence is still almost universal in furnace operation in this country. I feel satisfied that any careful comparison along the lines indicated by the record shown would convince any steel manufacturer of the wisdom of operating with three 8-hour shifts, purely from an economic standpoint. Speaking for the people with whom I am associated, we are greatly pleased over the change. I can speak for the men in the same terms, for our furnacemen are enthusiastic in their praise concerning the new plan, and there is no small amount of satisfaction in the knowledge that we have done a humane thing. It may be argued that, while the demands of humanity and economy are admittedly strong on the furnace platform, in favor of the 8-hour shift, its adoption is unwise there because of the effect it might have upon workmen in other departments, where the 9 or 10-hour day is at present prevailing, and where conditions would not commercially permit the universal 8-hour day. But conditions in a steel foundry cannot be found in any other department that are at all similar to those found around the furnaces, and that fact is apparent to molder, patternmaker, coremaker, machinist, electrician, or any other mechanic. Any argument which can be so readily met must fall, and its best answer is found in the fact that its adoption in the plant whose experiences have in a way been here described, has resulted in no tendency towards the demand for an 8-hour day among any of the skilled trades represented in our organization, after the lapse of sufficient time to make such a movement at all probable as a result of the precedent.

The Change is Justifiable

Therefore, viewed from any conceivable angle, I claim the change is justifiable, and you will do well to make it, so far as your open-hearth furnaces are concerned. As to your boiler firemen, each operating head must decide for himself. In our particular case it appeared to be, and finally proved to be, advisable from every standpoint. Conditions in certain other boiler rooms are very different from ours, practically the entire evaporation taking place during the daylight hours in many of them. Since the results are of some interest, however, I have included the comparisons made in our power plant. Reverting finally to consideration of the steelmaker, whose performance under both schedules is made the burden of this argument, the basic principle is absolutely sound, and rests on the incontrovertible fact that you cannot expect any man to give you the best that is in him when you keep him employed without intermission for 12 hours per day, seven days per week, at work making a heavy demand upon his mental and physical powers, under conditions of high temperature such as obtain on a furnace floor. To expect the best results under such circumstances is folly.

College Instructors Take Shop Course

Entered on the regular pay roll of the Westinghouse Electric & Mfg. Co.'s works at East Pittsburgh, Pa., this summer is an interesting group of employes, consisting of the members of the engineering faculties of several of the most important technical schools in the United States.

This unique group consists of 29 representatives from 25 different colleges located in 19 states. Believing the most effective way of learning the practical side of engineering and fitting themselves to instruct their pupils was to engage in the work themselves, these men have given up their vacation periods and have come to Pittsburgh to engage in actual manual labor, manufacturing the various types of electrical apparatus produced at the East Pittsburgh works.

The company officials were anxious to co-operate with the professors, and to encourage the closer union between the educational institutions and manufacturing concerns. With this idea in view, they offered them a special course of training in the works. They are engaged as regular employes and are assigned check numbers the same as the other employes. Engaged in this work, these men are enabled to become familiar with the new apparatus manufactured, and furthermore to get the industrial viewpoint in a manner that otherwise could not be obtained. This experience also enables them to learn first hand just what the young men whom they are educating will be expected to do and wherein the educational methods should be improved. At the same time the company gets the viewpoint of the college men, all of which tend toward a closer co-operation between the college and the factories.

The course includes regular work in the shops, and in addition inspection trips after working hours through the works to inspect the various pieces of apparatus.

Evening Meetings

Regular meetings have been held in the evenings at the rooms of the Westinghouse club in Wilkinsburg, where a general discussion has been indulged in, and interesting talks have been given by the various officials of the Westinghouse Electric & Mfg. Co. Prof. Geo. B. Thomas, of Colorado College, Colorado Springs, Colo., has been selected by the Electric company to take charge of his co-laborers and lay out plans for their work.

The following have been enrolled in the course: R. M. Berry, Virginia Polytechnic Institute, Blacksburg, Va.; W. D. Canan, Pennsylvania State College, State College, Pa.; R. F. Chamberlain, Cornell University, Ithaca, N. Y.; A. T. Childs, University of Maine, Orono, Me.; Myron Creese, Maryland Agricultural College, College Park, Md.; F. T. Dargan, Clemsen College, Clemsen, N. C.; F. B. Davenport, Georgia School of Technology, Atlanta, Ga.; L. A. Doggett, Harvard University, Cambridge, Mass.; S. P. Emrick, Purdue University, Lafayette, Ind.; W. A. Folger, University of Pennsylvania, Philadelphia; E. S. Foster, Lehigh University, South Bethlehem, Pa.; W. N. Gladson, University of Arkansas, Fayetteville, Ark.; G. W. Crow, University of West Virginia, Morgantown, W. Va.; H. D. Gruber, Lehigh University, South Bethlehem, Pa.; W. W. Hill, Alabama Polytechnic Institute, Auburn, Ala.; A. P. Kitchen, Massachusetts Institute of Technology, Boston; L. W. W. Morrow, Cornell University, Ithaca, N. Y.; M. S. Mason, University of Illinois, Urbana, Ill.; E. J. Neary, University of Pennsylvania, Philadelphia; A. F. Nesbitt, University of New Hampshire, Durham, N. H.; W. W. Perry, Lafayette, Easton, Pa.; C. T. Porter, Sheffield Scientific School, New Haven; V. C. Pritchet, North Carolina A. and M. College, W. Raleigh, N. C.; F. A. Robbins, Iowa State College, Ames, Ia.; E. B. Stavely, Columbia University, New York City; Geo. B. Thomas, Colorado College, Colorado Springs, Colo.; R. W. Witham, Worcester Polytechnic Institute, Worcester, Mass., and B. A. Wooten, of the Alabama Technical Institute, at Auburn, Ala.

Open-Hearth Furnace Design and Manipulation[1]

How the Various Areas and Dimensions of a 25-Ton Furnace Were Proportioned and the Wonderful Results Obtained

By John Ploehn

While considerable has been published about open-hearth furnaces with respect to general proportions and outline, there can be found very little on the refinements and details that play a very important part in the up-keep, manipulation and life of a basic open-hearth furnace. Instead of comparisons of different types and kinds of open-hearth furnaces, this paper will be confined to a description and the proportions, areas and various main dimensions of the 25-ton basic open-hearth furnaces in operation in the steel foundry of the Bettendorf Axle Co., Davenport, Ia.

The results obtained from these furnaces in time, quality and life have been exceptional. The average time of 2,000 heats in the two furnaces has been 5½ hours on an average per heat of 22½ tons. The record of these furnaces is a 25-ton heat made in 4 hours, 30 minutes, but all conditions were perfect to make this time. The charge was well balanced, the furnace comparatively new, and no trouble was experienced with the bottom or slag.

Average Analysis

The average analysis of this same number of heats has been carbon, 0.205 per cent; silicon, 0.315 per cent; manganese, 0.68 per cent; phosphorus, 0.018 per cent, and sulphur, 0.024 per cent.

The life, or number of heats made before shutting the furnaces down for repairs was as follows:

Initial run of furnace No. 1, 403 heats; second run of this furnace is now over 609 heats, and the indications are that it is still good for at least 40 or 50 more heats. The initial run of furnace No. 2 was 573 heats, and the second run of this furnace was 401 heats.

These furnaces were designed for the use of either fuel oil or producer gas, but up to the present time, they have been operated entirely on fuel oil. The chief feature of the design is the ample and generous proportions allowed in all portions of the furnace. The bath is both longer and wider, and from such little observation as the writer has been able to make, it is greater in these dimensions than is ordinarily found in this size furnace. When burning fuel oil a furnace should be much longer than when burning either natural or producer gas, but how much, is the question. In this case the furnaces are 10 feet longer than the average gas-burning furnace of the same capacity. On account of this extra length it is possible to obtain complete combustion before the center of the furnace is reached and thence on toward the other port the flame, having lost its cutting action and sharpness, very closely resembles a gas flame in appearance and action. For a 25-ton heat, the bath is neither shallow nor deep, but what would be called a medium depth, which seems to give better, quicker and more uniform quality of metal than either a shallow or deep bath. The depth of bath for a 25-ton heat is approximately 16 to 17 inches. The area of the hearth is 260 square feet, which allows a trifle more than 10 square feet per ton.

The general outline and dimensions of the hearth are shown in Fig. 1. At the port ends, it will be noted that there is no dog-house or monkey, these being omitted by using water-cooled oil burners. The area of the flues or up-takes leading to the slag pockets is 28 square feet for each end of the furnace. The distance from the hearth bridge to the under side of the roof is greater than the width of the ports, and the area at this point is 40 square feet at each end of the furnace.

Particularly when using oil, the construction of the ends of the furnace requires special care, as the flame is inclined to be extremely sharp and will cut out the ends of a furnace in a short time. This is almost entirely prevented by the extra length and the large areas at the points previously mentioned.

These furnaces were first designed with a hip roof and with the side walls contracted 12 inches at the port ends. After the initial run of each furnace, both the side walls and roof were made straight.

With the hip roof and contracted sides, both the roof at the hip, and particularly the side walls at the point of contraction, were cut away on the inside long before the adjoining parts of the roofs and walls were badly damaged.

The expansion and contraction lengthwise is also better taken care of with straight walls and roof than with the hip roof and contracted ends.

A small door is provided in each end of the furnace near the burner, approximately half-way between the top of the hearth bridge wall and the end of the hearth, and it has been found to be very useful for inspecting the end of the furnace, and also for watching the action of the burners and the flame at this point.

Water-Cooled Burners

The water-cooled burners, while requiring water for their operation, which in some localities would be quite an item of expense, have a great many advantages which more than offset the cost of the water required for their operation. The most important advantage is that the flame can be correctly located and positively kept in that location, because the burners are left in the furnace at all times. The burner tip, being water-cooled, is not liable to give trouble with the oil coking, which is the case with the plain burner.

The general outline of the installation of these burners on the furnaces is shown in Fig. 2. The burners can be moved horizontally or vertically, and the tip of the burner can be elevated or depressed as may be required. The oil and air connections, being stationary, cause less trouble than on burners where they are pulled in and out at every reversal of the furnace.

Fig. 2 also shows a further use of the water after leaving the burner. The water from the main is first led into the burner, and from the burner into a bulkhead through which the burner passes. From the bulkhead the water is led to a

[1]Presented at the Buffalo meeting of the American Foundrymen's Association.

sewer. The use of this bulkhead is to support the burner, and also makes possible a smaller opening for the burner than through an arch brick opening, and being a cooler wall, lasts much longer and makes it possible and more comfortable for the melter to look into the end of the furnace for the inspection of the roof and the flame. With water-cooled burners, the furnace is reversed more uniformly and regularly, as it does not require the melter to climb over charging cars, etc., to pull out and shove in the burners, saving a walk of about 100 feet every 20 minutes, conserving this time and strength for better purposes.

These furnaces have always been lighted at the slag pockets which heats the checker brick quicker and is much easier on the new brickwork above, and does away with most of the preliminary heating in the hearth, also keeping all ashes and refuse out of the hearth.

The doors and door frames are water-cooled, this feature not only protecting the door jambs, but also is appreciated by the melters, especially in summer. The door frames usually run from 400 to 600 heats, the center frame usually failing first. When the water jackets on the doors are burned out, they are relined solid with fire brick, and are used during the winter months. The use of coarsely ground chrome ore has been found very valuable for patching door jambs and front and back walls at the slag line. It sinters easily on vertical surfaces and makes a more permanent and lasting repair than magnesite.

Another advantage in having large areas at the end of the furnace is that the velocity of the outgoing gases is decreased so that the slag is not carried over into the slag pockets in any great masses, or in a molten condition. With ample areas, the top of the hearth bridge wall should also be at least 2 feet above the normal slag line and in this design, this dimension is very nearly 2 feet, 6 inches.

A detail that is often overlooked, is the intersection of the bridge hearth and port or flue. This is very often brought up to a square corner, which requires the outgoing gases to continue toward the end walls before going downward. To allow the gases to assume as near as possible their natural flow in turning downward, the intersection of the port and the hearth bridge should be on an angle of about 45 degrees.

During the two runs of these two furnaces, the slag in slag pockets has been in a granular or lumpy state, so that it was easily removed with pick and shovel without injury to the slag pocket walls, in two days after the shut-down. A false bottom of old steel plates covered with broken bricks and silica sand is placed 4 inches above the floor of the slag pockets, this air space under the entire slag pocket serving to chill the slag and to keep the pockets cooler than if same had a solid floor. The area of the slag pockets is 90 square feet.

The slope of the checker bridge begins 1 foot inside of the slag pocket, and extends into the checker chambers a distance of 7 feet. This easy slope allows free passage of the gases and prevents the retarding of gases due to too abrupt deflection against port ends or the checker chamber roof. The area of the opening above the checker bridge wall is 28 square feet.

The checkers are directly in the rear of the slag pockets, and are of very large proportions, the actual volume being 120 cubic feet per ton. In addition to this extraordinary volume, all the checker brick are of silica, and the results so far obtained, prove that it is a good investment, taking into account the additional first cost of silica brick over fire brick.

After both the initial and second run of each furnace, the only repairs required for these checkers was a thorough cleaning, and from their present condition, the checker brick will be good for at least another run of 500 heats, and then only the upper five or six courses will probably be replaced with new brick. The silica brick seem to have a greater capacity for storing, and are quicker to absorb heat than clay brick.

The area underneath the checker brick should be large so that the incoming and outgoing air and gases can distribute themselves uniformly through the various passages between the checker brick. The area of the flues under the checker brick in the air chamber is 12 square feet, and in the gas chamber is 8 square feet. The area of the flue leading from the checker chambers to the valve is 12 square feet, and this same area is maintained through the valve and in the flue leading from the valve to the stack.

For convenience in cleaning out the flues leading from the checkers to the valve when the furnace is down for repairs, a cast iron, rectangular man-hole and cover is placed in the roof of the flue directly back of the center of the checker chambers. This man-hole saves considerable time when cleaning out these flues under the checker brick, and so far has not become warped or leaky.

As the area of the flue leading to the reversing valve is practically the determining area, a summary is given below of the various areas

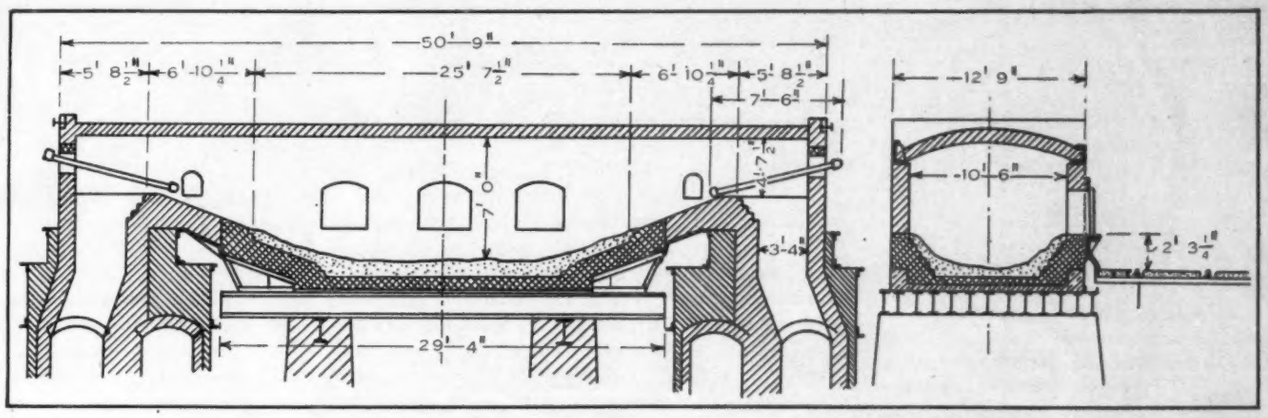


FIG. 1—LONGITUDINAL AND CROSS-SECTIONS OF OPEN-HEARTH FURNACE

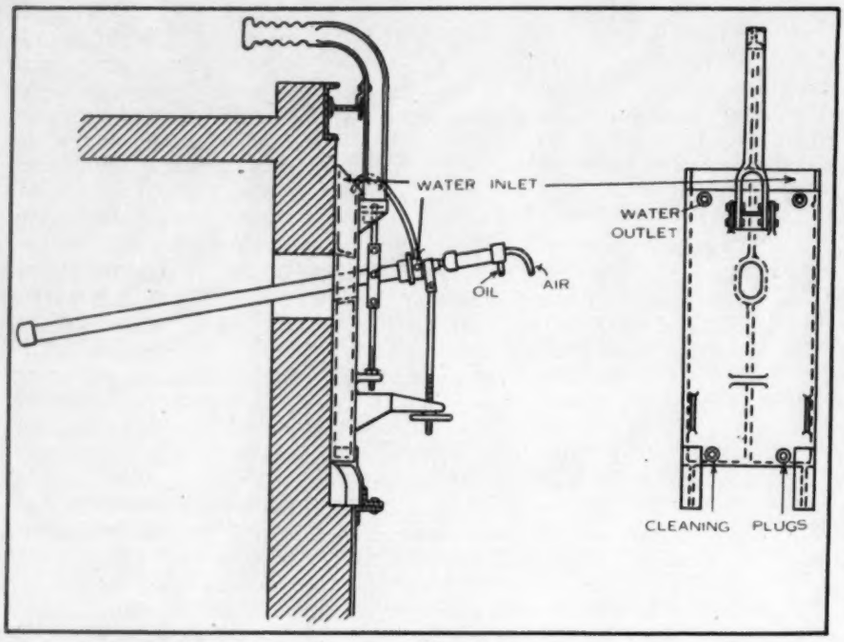


FIG. 2—WATER-COOLED FUEL OIL BURNERS ATTACHED TO OPEN-HEARTH FURNACE

mentioned, assuming this area as unity:

Area under checker chambers...1.66
Area over checker bridge wall...2.3
Area in ports from slag pockets to port ends.....2.3
Area over hearth bridge wall....3.3

Water Drainage

To prevent water from accumulating in any of the flues or checker chambers, a drain is located in each flue and chamber, which is connected to a sewer discharging into a deep well, from which the water is pumped by an automatic electric sump pump. A horizontal U trap is placed below each drain, so that the air or gas cannot short-circuit, or pass from one chamber or flue to another.

With these furnaces were tried radial brick stacks, lined with fire brick their entire height. The height of stacks is 125 feet, and the diameter inside at the bottom is 5 feet, 9 inches, and at the top, 4 feet, 6 inches. These stacks have been in service for three years, and have as yet shown no cracks or weaknesses. The advantages gained are that they do not require painting every year, do not corrode, and are not affected by gases, and being a poorer conductor of heat, will maintain a higher temperature, and subsequently better draft than a steel brick-lined stack of the same height.

While drying out, and after the oil has been started, the roof of a furnace is a peculiar and particularly tricky structure. The life of a roof is practically determined by the treatment it gets, and its behavior during the first 50 heats.

To facilitate letting out the roof tie rods, both the nuts and tie rods are locked on the back or tapping side of the furnace so that all expansion and contraction can be taken up by loosening or tightening the nuts on the front side of the furnace, saving, thereby, considerable time, and allowing the amount of lengthening and shortening to be more accurately measured.

To prevent getting the roof out of shape in its earlier stages, a roof rigging was put on which is simple in its construction, and has been found to be very useful and effective in holding the true arch shape of the roof until the roof brick are glazed enough to be practically one continuous mass. The rigging is shown in Fig. 3, and consists of three rails extending the entire length of the roof. The rails are suspended from cross beams which are supported on the side buck-staves. Between the rail clamps and the cross beams, wedges can be introduced to bring pressure on any particular rail when the weight of the rail alone is not sufficient. If necessary, the weight of the rail may be lifted entirely, making it independent of the roof if this should be found necessary. The cross beams are not rigidly connected to the side buck-staves, and the expansion and contraction of the roof are taken up by the tie rods.

With this rigging, the bulging of a thin part of the roof can be controlled, and in most cases, gradually brought back to the original true arch. An inspection of furnace No. 1, equipped with this rigging, shows that the roof still has its original true arch shape and that it has burned off uniformly on the inside, for which, of course, proper credit should be given to the melter for the careful handling of the furnace.

Skew-Back Channels

On these furnaces, the skew-back channels are rigidly connected to the buck-staves so that the roof is entirely free from the side walls. A space is left below the skew-back channels so that the vertical expansion of the side walls can be taken care of. This keeps the roof practically straight throughout its length, and thereby makes it stronger and of longer life than if the skew-backs rested on the side walls and moved up and down or varied with the same.

A level-headed melter will appreciate and recognize the value of re-

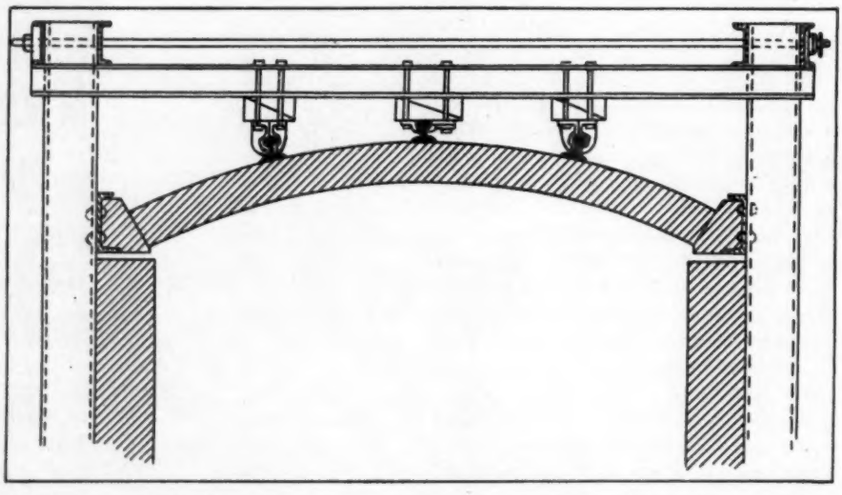


FIG. 3—RIGGING FOR HOLDING THE ROOF OF AN OPEN-HEARTH FURNACE

cording gages and appliances that will show him the actual conditions of the elements that control his product, and they will be an incentive, rather than an excuse for not getting a good product.

When these furnaces were new, some heats were wild and over-oxidized, and after analyzing all the conditions and charges, the trouble was finally located as being due to excessive draft under certain weather conditions. To regulate this, a recording draft gage was installed and this has proved to be a very valuable instrument. The damper can be regulated to give the same amount of draft for all conditions of weather and furnace, and the results have been accordingly more uniform.

For this particular design of furnace and stack, the draft that gave the best results was 0.8 inch of water. Being recording, it gives a history of the day's run and permanent record for future comparison.

Automatic Warning for Operator

An air controlled butterfly valve is used on these furnaces and to give the operator warning that the valve is not entirely closed, a small, inexpensive electrical device was installed. It consists of a contact point at the end of stroke, which, when the valve is closed, closes the circuit, and lights a light on the platform. As the valves are usually under the platform and out of sight of the operator, it is hard to detect leaky valves, which, if allowed to continue, in time cause serious delay and trouble.

Another cause for oxidized metal was found to be due to the admission of too much air at the reversing valve. To give the operator the necessary information and to prevent guesswork, the screw stand on the platform was calibrated to show exactly the number of inches the doors are open. Since this was done, the doors are open only about one-half as much as before.

The practice of using too high air or steam pressures has been found to be injurious to quality. The pressures necessary vary for different furnaces and conditions. For these furnaces, the air pressure during melting is about 60 pounds, and during the time of working, about 40 pounds. The oil pressure is slightly higher or lower, depending on the kind of burner or atomizer used, and the distance necessary to pump the oil.

Various methods have been used to cover the steel plate of charging platforms, but none seems to give perfect satisfaction or is able to stand the heat or hard usage. As an experiment, a cinder concrete floor was laid on the steel plate, of a thickness which raised it to a level with the charging machine rails. This is shown in Fig. 4. To prevent corrosion of the steel plate in contact with the cinder concrete, a sheet of heavy tar paper was first laid on the steel plate. This floor has stood the hard service of three years' operation, and is in splendid condition at the present time.

This flush concrete floor has the advantage of being able to wheel across the tracks the materials used for the furnaces, furnishes the melter and helpers with a better and surer footing for rabbling out a puddle hole or when tapping heats, and is also cooler than a bare plate floor. Next to the furnace, removable cast plates in sections 4 feet long are laid even with the rails.

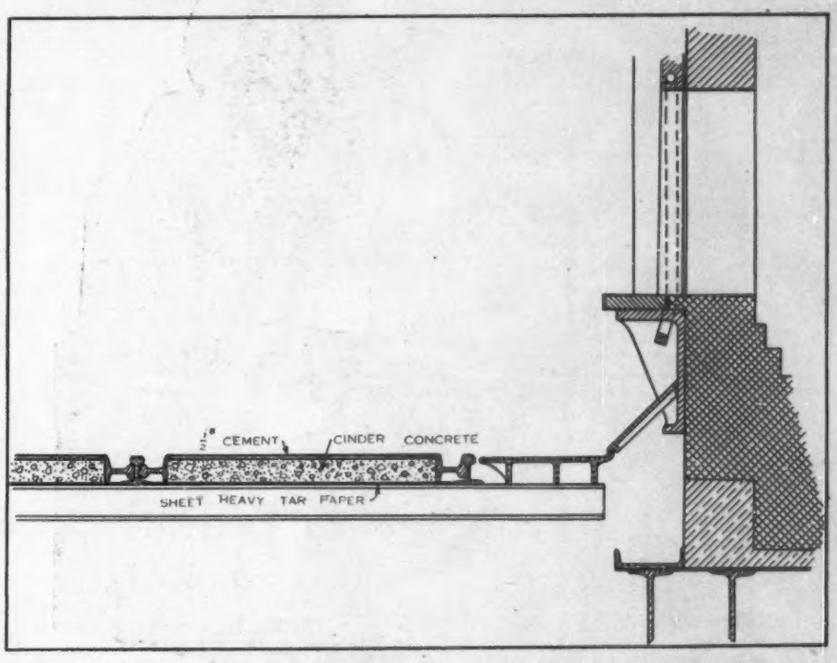


FIG. 4—CROSS-SECTION OF CONCRETE FLOOR ON CHARGING PLATFORM

Bins for storing the various materials used on the charging platform, not only save a waste, but also make a safer and cleaner working floor. They are easily and cheaply built of a bottom plate, with sides, ends and partitions riveted to it, leaving the entire side, facing the furnace, open for easy access for shoveling. The sides extend to a height to clear the charging machine, and the materials must be kept below that level. It is surprising the amount of materials that can be placed in a small confined area. The several bins for one furnace are about as long as one-half the length of the furnace, but in them are kept sufficient materials for a week's run of fluor-spar, magnesite, burned lime, iron ore, dolomite and chrome ore. The bins are placed on the concrete floor, but are not fastened in any way, so that they can be easily moved in case of furnace repairs.

Besides the draft gage, both recording oil and air pressure gages are used, and they have been found valuable to indicate an increase in pressure, especially of oil, which often creeps up gradually.

It is true that the basic open-hearth furnace is a scavenger, and will make steel out of any kind of stock, yet to maintain uniform analysis, dead metal, and the high temperature necessary for the general steel castings, great care and judgment are necessary in the kind and proportions of the stock charged.

Thin and light scrap, especially when badly rusted, should be avoided because not only is the percentage of loss higher in the furnace, but the large amount of oxide is hard on the basic lining and very liable to produce an over-oxidized, or wild metal.

To arrive at the proper proportions necessary for different kinds of scrap, a series of test heats were made, in which the percentage of pig iron was varied from 50 per cent to as low as 31 per cent, the various kinds of scrap making up the remainder of the charge. The percentage of different kinds of scrap was varied according to their carbon

content. The pig iron was assumed at 3 per cent carbon, and the carbon content of the scrap had to be sufficient so that the calculated carbon of the charge was not lower than 1 per cent, with an average of 1.25 per cent. There was a total of approximately 50 heats in this test, and the time of heat, final analysis and kind of metal of any one of these tests did not vary to any appreciable extent from the grand average of all heats.

This proved conclusively that scrap of different carbon content should be kept in separate piles, and the following classification resulted:

Scrap or carbon content up to 0.30 per cent is kept in one pile or bin. In this class are structural shearings and short structural sections, couplers and knuckles and shop scrap.

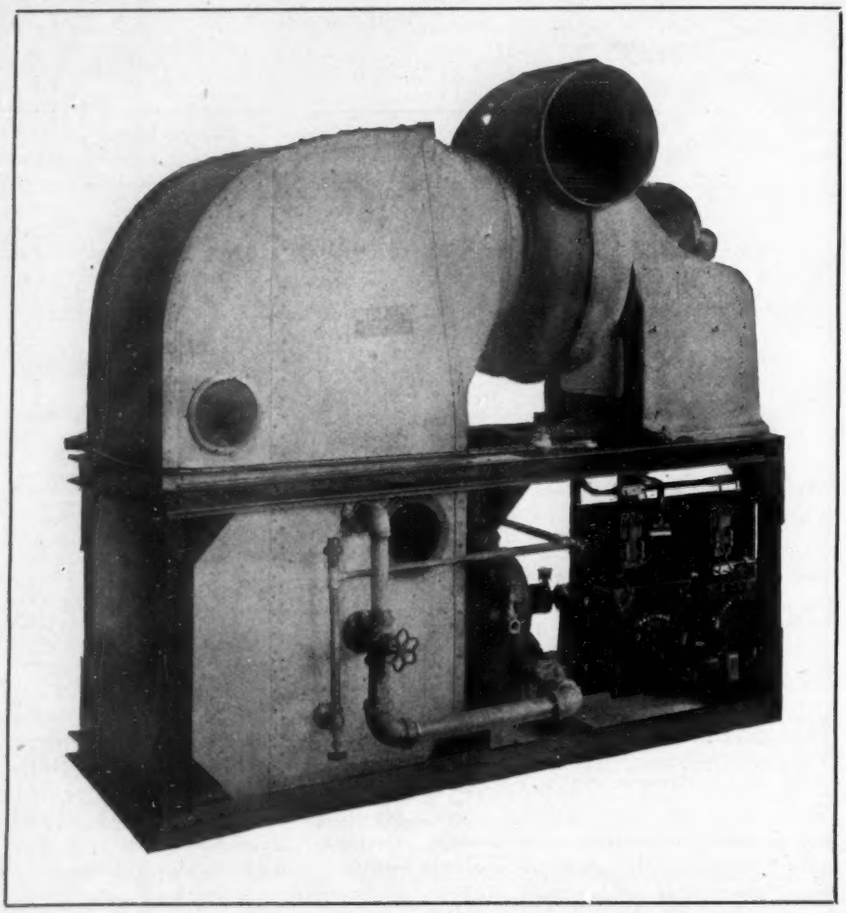
Scrap of carbon content from 0.30 to 0.60 per cent is the second class. In this class are old rails, etc.

The last class is scrap of carbon content above 0.60 per cent. In this class are springs, old rolls, etc.

At this plant, to be able to store an ample supply of charging materials under roof, not only for the advantage gained in the winter months, but also to be able to separate the various classes of scrap, large reinforced concrete bins were built in the furnace bay. The sides and ends of all these bins are 14 feet above the floor level, the bottom of the bins extending 4 feet below the floor to bed rock. Half of the bins are for pig iron, the iron from different concerns, or of off analysis being kept separate. The unloading of cars and the loading of charging boxes is accomplished entirely by electric magnets, which makes possible the storage of materials in bins, 14 feet high. To facilitate keeping these various kinds separate, it is necessary, when purchasing scrap, to specify that the various kinds be shipped in separate cars, and this can be done without additional cost.

If it is left to the yard or stock men to make up the charges, usually the scrap that is nearest at hand, or in his way is sent to the furnaces, the consequence being that some heats melt high and some soft, introducing an unnecessary element of uncertainty in the time and quality of the product.

When it can be depended that the heats can be made in certain time, the cycle of smooth operation is reached, in that the time of charging and the work on the molding and pouring floors can be arranged to better advantage.



SELF-CONTAINED AIR CLEANING AND COOLING UNIT

Self-Contained Cleaning and Cooling Unit

The problem of providing a continuous supply of clean air at the proper temperature, in factories or other works, is of considerable importance. The McCreery Engineering Co., Detroit, Mich., builds a self-contained ventilating unit, which is shown in the accompanying illustration. Compactness has been the object in the design of this equipment, which includes a direct-connected blower and motor, air washer and eliminator, and circulating pump and motor, all mounted on a single base. No outside floor space is required for the spray water pump and motor, as they have been set under the blower and its motor, in what would otherwise be waste space. The sub-base is built of plates and angles and contains the circulating tank.

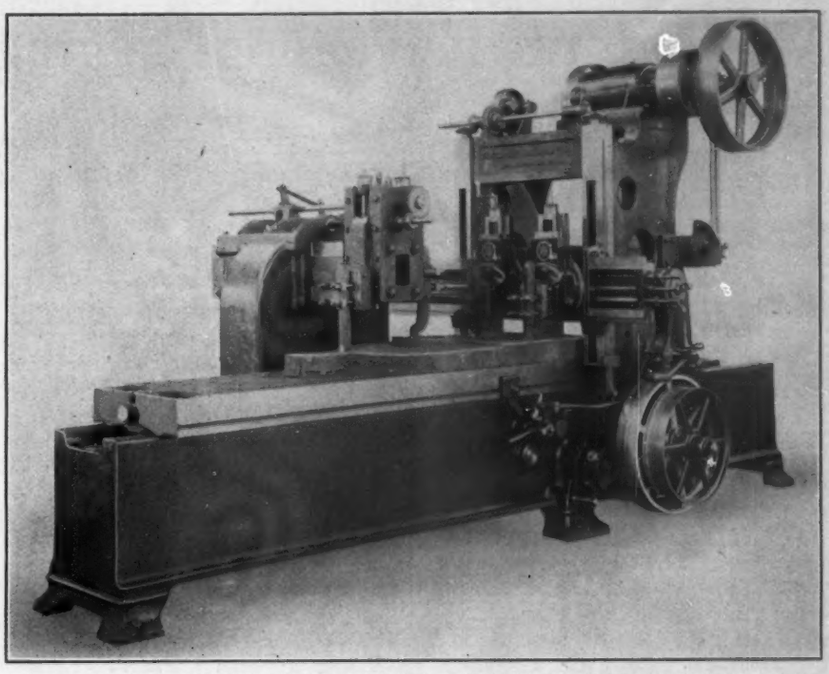
The washer takes impure or warm air, drawn in by the blowers, cleans and cools it in the spray chamber, where a healthful degree of humidity is added, and removes the free moisture in the eliminator chamber. A high pressure pump and a fine mesh strainer are rendered unnecessary by a flushing spray head. This flushing device is a positive mechanical motion which does not affect the spray setting. All iron parts which come into contact with the water are galvanized.

With one of these cleaning and cooling units the air may be drawn down through one of the cleansers and delivered through ducts to points where it is most needed. If required, outside air may be drawn in and mixed in suitable quantities in the circulating duct to meet the varying requirements of different days. The units are independent of the heating system and can be operated as required. By placing indirect heating coils in the blower delivery duct, they can also be used for warming purposes to supplement direct steam heat. All necessary controlling valves, electric switches and fuses are provided and no special foundation is required.

During 1911 the shipyards on the River Weser, at Bremen, Germany, delivered 43 new vessels of 141,322 tons register, compared with 24 vessels of 43,217 tons register, for 1910, while 50 vessels of 228,179 tons remained under construction, as against 42 vessels of 146,229 tons for 1910.

Handling Iron Ore With a Locomotive Crane

The practicability of employing locomotive cranes for handling iron ore is shown in the accompanying illustration, which is a view of a crane in use at the plant of the Girard Iron Co., Girard, O. The Browning Engineering Co., Cleveland, manufactures this type of crane, which is fitted with a clam shell bucket, and is mounted on two standard four-wheel trucks. This construction enables the crane to turn on curves of very short radius. The particular crane shown was equipped with a 38-foot boom, and was built to lift from 15 to 50 tons at radii varying from 10 to 38 feet. It is said that an actual test showed it could lift 40 tons at 12 feet radius by using outrigging. The iron ore is unloaded from cars either directly to the conveyor system or is placed in stock. From the stock pile it is handled by picking up a bucketful and delivering it to the conveyor. In this instance the crane is mounted on a trestle which enables the storing of large quantities of ore.

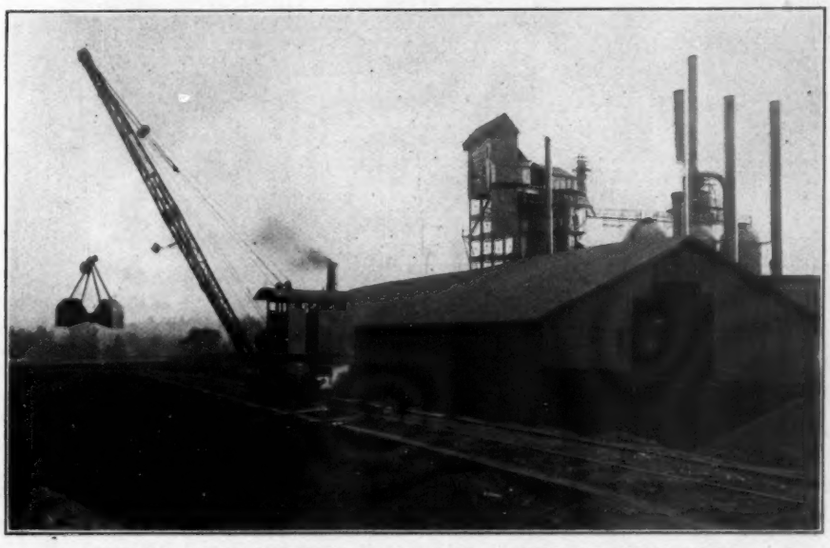


A 28 x 8-INCH PLANER WITH SPECIAL HOUSINGS CARRYING TWO TOOL HOLDERS

A Special Planer for Machining Bases

The accompanying illustration shows a 28 x 8-inch planer, equipped with a special housing carrying two tool holders, built by the Rockford Machine Tool Co., Rockford, Ill., for planing the bases of upright drill presses. The machine is provided with a four-speed drive, giving four cutting speeds from the line shaft and eliminating the usual countershaft. The special heads are mounted on a ram of square construction, the feeds for these heads being driven through friction, the mechanism for which is mounted on the intermediate shaft of the planer and at the rear of the machine. The feeds are operated and reversed by the trigger gear shown on the front of the head and within easy reach of the operator.

In machining the drill press bases, the flat T-slotted base is planed and finished with the two heads on the regular cross-rail. While this is being done, the rear head on the special attachment machines the top of the hub for supporting the drill-press column and the front head planes the pad for the outer bracket at the rear end of the base. It is claimed that this machine is doing the work satisfactorily and in one-half the time previously required for doing the same work on a similar machine without the special attachments.



USING A LOCOMOTIVE CRANE FOR HANDLING IRON ORE

Waste in Utilizing Steel

The failure to use the latest methods in the hardening and tempering of steel, is responsible for considerable waste in the utilization of steel. In a pamphlet recently issued by the bureau of mines, dealing with mineral wastes, an instance is cited in which a manufacturer of steel blades, at present making about 300,000 blades a day, has reduced his costs more than one-half through the services of an expert chemical engineer. About three tons of cold-rolled steel per week are now used. The blades were formerly hardened by using 65 machines which utilized gas and blast for the heating process, ran day and night, and required 15 men for their control. Now the company is using six electrically-heated furnaces which, in an 8-hour day, give double the old capacity and require the services of only two operators. For the tempering process, the blades, 70 pounds at a time, are dipped into an electrically-heated salt bath, and are held for a definite period at a temperature precisely controlled by pyrometers. In contrast to this, one of the largest manufacturers of small steel articles is still employing the hand labor of blacksmiths for hardening each article, getting a much more variable result at many times the cost. The company believes that its supposedly secret practice is an asset of great value.

Method of Revealing Segregation in Ingots[1]

Results of a Series of Experiments in Which Molten Copper Was Employed to Detect Defects in Steel Ingots

By Sir Robert A Hadfield

While knowledge has long been sought as to the changes which take place in the interior of masses of steel during cooling down from the molten to the solid state, few experiments of a definite nature have been undertaken. This has been the more unfortunate because steel of any nature or type, while so cooling down, is subject to the development of defects of a somewhat serious character. These chiefly come under the terms segregation or segregated areas, and are largely due to the fact that the two chief deleterious elements, sulphur and phosphorus, always present in steel to a greater or lesser extent, liquate and separate out from the mass in those portions of the ingot or casting which remain fluid for the longest period of time during the cooling down to the solid condition. Carbon and manganese, also to some extent nickel and chromium, also liquate, but they are not directly harmful in the same way as the two elements mentioned.

In other words, it is well known that at a certain stage of the cooling down process of molten steel the complex phenomenon of liquation is met with and causes much difficulty. Possibly this phenomenon is more marked in its harmful characteristics in iron and its combinations known as steel than in any other metallurgical product. This is no doubt to some extent due to the high temperature which is necessarily employed during the manufacture of steel, which varies from probably about 1,400 degrees Cent. in alloy steel, such as manganese steel, to about 1,650 degrees Cent. in molten steel of mild quality. This difficulty is intensified because of the peculiar behavior of the elements present. While sulphur and phosphorus give the most trouble, the above remarks also apply to the element carbon and the metal manganese alloyed with iron, and, as mentioned, to a less extent as regards nickel and chromium.

This segregation of the elements

[1]Presented at the annual meeting of the Iron and Steel Institute.

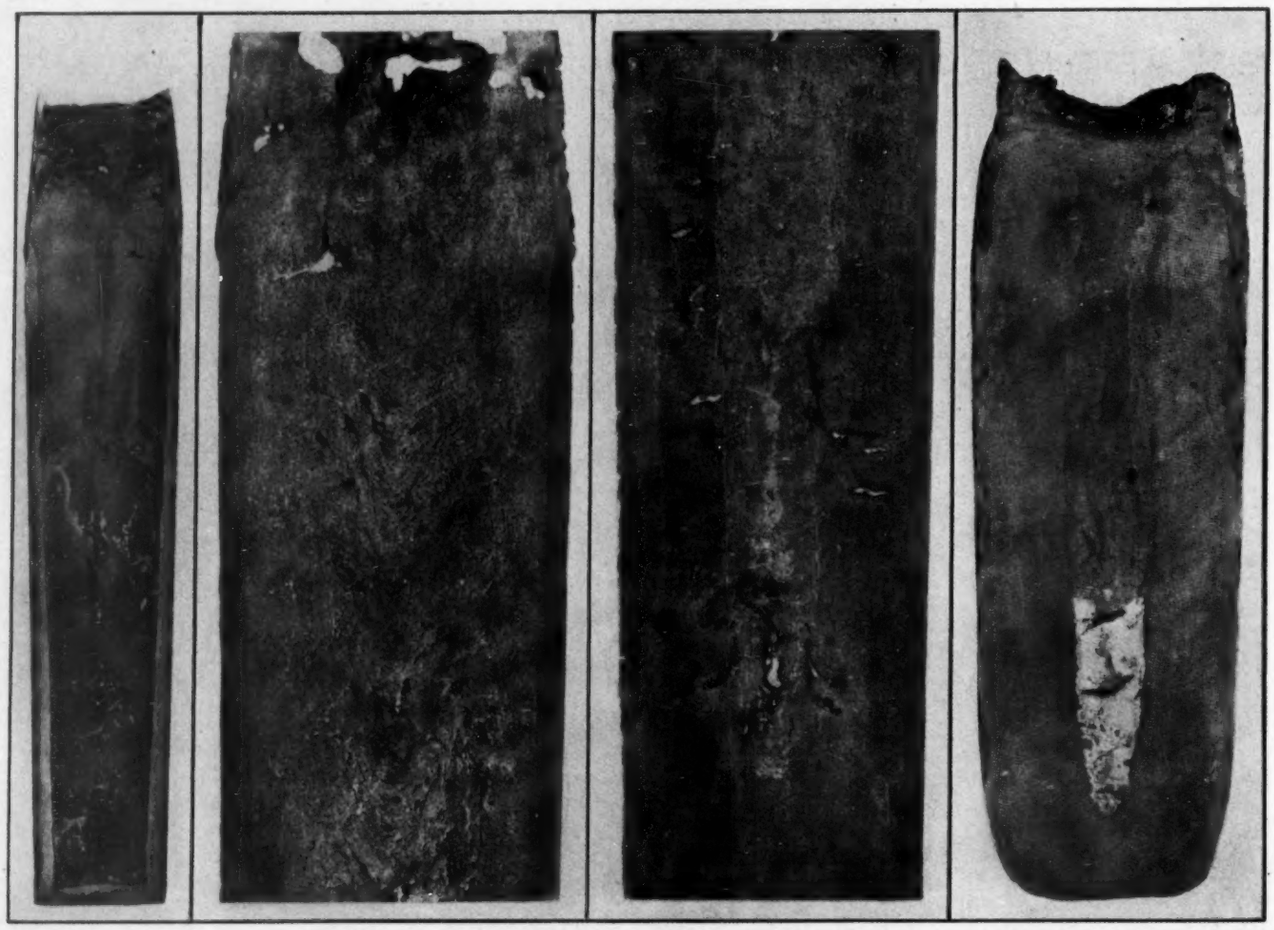


FIG. 1 — DARK AREAS SHOW PENETRATION OF COPPER IN INGOT

FIG. 2—SULPHUR PRINT OF INGOT NO. 7455/1978A

FIG. 3—SULPHUR PRINT OF INGOT NO. 7531/1978A

FIG. 4—COPPER POURED INTO INGOT 15 MINUTES AFTER CASTING

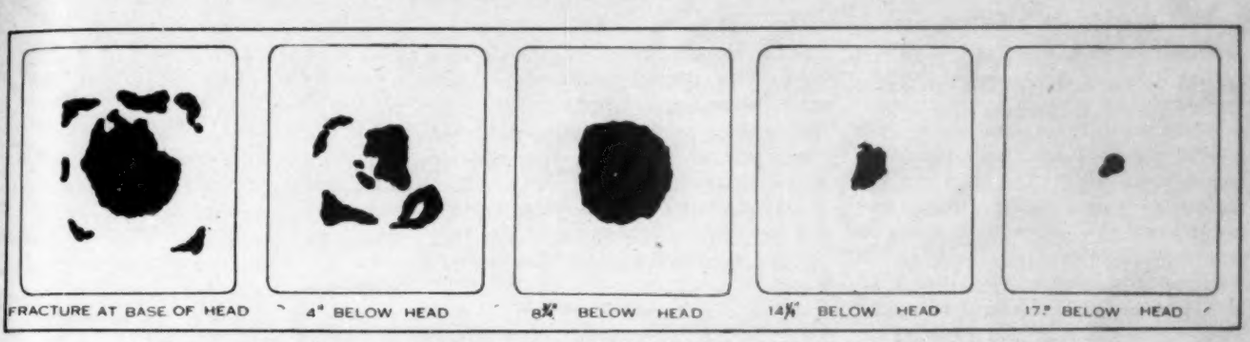


FIG. 5—DIFFERENT SECTIONS OF A 2½-INCH INGOT, SHOWING COPPER PENETRATION

referred to gives a brittle, impure, and weak steel, which in the finished article may prove not merely objectionable, but dangerous. There is no proof that segregation occurs in fluid steel itself, that is, all the elements are then well fused and not segregated; the difficulty begins as soon as the mass commences to cool down; in other words, segregation appears to be a function of the lowering of the temperature. Whether this arises owing in some way to the lowering of the tension of combination of the molecules, if one can use this term, is not certain.

Effect of Ferro-Static Pressure

In any case, however, the difficulty experienced seems to be almost entirely confined to the steel remaining liquid to the latest stage, probably partly through want of ferro-static pressure occurring in the center of the mass. Thus, a steel of otherwise suitable composition, that is, sufficiently low in the deleterious elements sulphur and phosphorus, when cooled down will show, upon analysis, an increase of these elements at the segregated areas in some cases amounting to seven or eight times the original percentage. A sample of steel taken whilst fluid from the upper portion of an ingot is equally as pure as the lower portion. The difficulty only arises on cooling down and in that portion of the ingot or casting where the ferro-static pressure is lowest.

Such segregated area if not removed remains in the casting, and becomes drawn out during the forging or rolling, or while being otherwise manipulated; thus seriously weak places mechanically will occur in the finished article. In some cases these defects are removed; for example, gun ingots are cast solid and are afterwards usually bored out to remove the segregated areas. But this cannot be done in forgings requiring a solid section, so that the center of disturbance remains present in such areas, in some cases giving rise to the production of articles possessing serious internal weakness which may break, if not at once, later on in service. This has, for example, been noticed in the case of rails, and dangerous accidents have resulted through their breakage.

The author thought that if it was possible to find means of ascertaining how this segregation arises, useful information would be obtained and methods of investigation opened

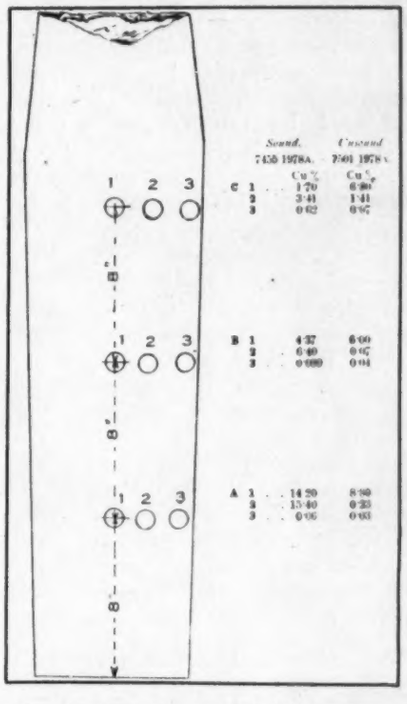


FIG. 6—SECTION OF ONE OF TWO 6-INCH INGOTS, SHOWING PERCENTAGES OF COPPER IN DIFFERENT PARTS

up by which the difficulty could be dealt with and overcome. He therefore presents the results of this research and the methods adopted, which to his knowledge have not before been tried. They are simple, and yet by their use afford considerable information in the desired direction, that is, they show, to some extent, what is going on inside the molten mass during the cooling portion of the process.

The research commenced in this manner. It was reasoned that possibly some addition, preferably metallic, could be made to steel while in its molten or partly fluid condition which would give the desired effect. Thus, upon breaking up the ingot when cold, if it would show the presence of the added metal in some clear and definite manner, such as by difference in color, useful information would be obtained. The author, therefore, after a considerable number of experiments with various metals, selected copper, which, by its slightly higher specific gravity as compared with iron, would have a tendency to fall or drop down the central portion of the ingot being experimented upon; moreover, by its distinctive color at the parts where it is alloyed with the iron its presence would be apparent.

First Experiment

In the first instance a small ingot 2½ inches square and about 30 inches in length, was poured into an ingot mold in the ordinary way. The composition was as follows: Carbon, 0.41 per cent; silicon, 0.53 per cent; manganese, 1.32 per cent. This ingot was furnished with a sand head, as shown in Fig. 1, the object of the sand head being to feed the shrinkage taking place in the remaining portion of the ingot. In other words, the ingot mold itself being of cast iron and the ingot head of sand, the molten metal in the latter remains fluid for a much longer time and helps to feed the shrinkage or contraction of the remaining portion of the ingot when it cools down to the solid condition.

Soon after the small 2½-inch ingot was cast, a few ounces of molten copper were poured into the center of the hollow space remaining in the sand head, about 1½ inches from the outside. The time which elapsed between the casting of the ingot and the pouring of the copper into the

hollow space was approximately 30 seconds. In this case, the result of pouring the molten copper, which was added in a comparatively cool condition, that is, it was not as hot or fluid as it should have been, appeared to be to chill the upper portion in the sand head. At first it was thought the copper had not penetrated the molten steel of the ingot at all. However, on breaking off the ingot head and making a longitudinal fracture it was discovered that the copper had forced its way through a hole in the center of the ingot of very small diameter, and penetrated nearly the full length of the ingot, an interesting result and somewhat unexpected. Fig. 5 shows the appearance of the ingot when it was broken under the hammer. The cuprous areas are indicated as they appeared in the fractures of the material.

Copper Penetration

The copper had penetrated into those portions of the ingot where piping usually takes place, and thus indicated the exact location where what may be termed inter-crystalline unsoundness or segregation is developed. It may be mentioned that this particular type of inter-crystalline unsoundness is not usually seen or detected in the fracture of an ordinary ingot when cold; it is only revealed by a polished section after etching. The cuprous areas in these small ingots probably represent these segregation areas.

This experiment showing interesting promise, the research was continued on several ingots 6 inches square, each about 3½ feet in length, and weighing about 4 cwts. The design of these was similar to the small ingot just referred to, that is, the ingot itself was cast in an iron mold with the head portion of sand.

Into the head of the first 6-inch ingot, No. 7,455/1,978A, 15 pounds of fluid copper, previously melted in a plumbago crucible, were poured half a minute after casting. The addition of the copper was carried out somewhat earlier than at first intended, because in the previous experiment on the ingot of small size the copper appeared to cause the steel in the head of the ingot to set. In the case, however, of the 6-inch ingot, the copper did not cause the steel in the head to set as expected; most of it descended by its superior gravity almost bodily to the lower portion of the ingot. This ingot was parted into two portions so as to give a central longitudinal section; the section was then etched. Fig. 1 shows the appearance of the first ingot, the dark portions being those colored by the added copper. From the results obtained it will be noted that half a minute after casting the ingot appears to have set to a thickness of about ⅝ inch to ⅞ inch on the bottom. In the cuprous areas will be noticed crystals which have the same appearance as the outside envelope.

As in this 6-inch ingot the copper was found to have been added somewhat too soon to give a full indication of what occurred on the steel reaching its setting or chilling point, the experiment was repeated on an ingot made from heat No. 7,501/1,978A. In this case 15 pounds of molten copper were added after a period of 3½ minutes had elapsed after casting. This steel settled well in the sand test, also in a 2½-inch ingot made at the same time, but the larger ingot was not quite sound. This was not, however, in any way due to the added copper, but to the interior of the mold being slightly damp. The experiment was repeated on a perfectly sound ingot and the results were the same. It was thought, therefore, interesting to present the unsound ingot to show that the same law applied to unsound as to sound steel. The dark areas in Fig. 5 show the cuprous portions of the first ingots. These portions are indications of the state in which the interior portion of the ingot existed 3½ minutes after casting. After such a comparatively long interval of time and in such a small ingot, it is somewhat remarkable that the copper should have descended so deeply. If the copper is added too early, that is, before the steel solidifies, it displaces or penetrates the molten material remaining. If the copper is added when solidification is completed, then it does nothing more than fill up the cavities, or strengthen segregation areas which are not really mechanically solid.

Why Rapid Cooling is Advantageous

It would appear from these experiments that a valuable source of information is opened up for making tests with regard to rates of cooling, segregation and liquation. Moreover, these results show that the interior of an ingot, even of small size—and it will be, therefore, more so in a large ingot—remains hotter for a much longer period than has been thought to be the case. It can, therefore, be more readily understood why segregation proves so harmful, for, owing to this longer time of cooling and the reduction in the ferro-static pressure, naturally much greater opportunity occurs for the liquation of such harmful elements, sulphur and phosphorus. The more quickly the steel sets, the less opportunity is therefore given for this segregation. This fact has long been known in a practical way, but the reason for it has not been so apparent. The results of the present experiments seem to clearly indicate why quick cooling is advantageous.

In Fig. 6 are shown the percentages of the copper found at the respective portions of the ingots Nos. 7,455/1,978A and 7,501/1,978A, as marked.

Distribution of Copper in Ingots

The sulphur print, Fig. 2, shows the distribution of copper in ingot No. 7,455/1,978A, the cuprous portions being lighter in color than those which are free from copper. It will be noted that the acicular crystallization of the copper free envelope ends abruptly where it joins the cuprous interior. In the cuprous portion the sulphur is evolved from innumerable small points, whereas in the copper free envelope the sulphur is evolved quite differently, giving an even brown coloration.

Fig. 4 shows a larger ingot of about 14 inches diameter, into the head of which about 28 pounds of molten copper were poured 15 minutes after casting. The head was then covered with charcoal, and was not afterwards disturbed. The ingot was allowed to remain in its mold for one hour. The material was annealed and a section prepared, sulphur-printed and etched. The copper was found to have penetrated to within about 9 inches of the bottom, as will be seen, thus showing that even 15 minutes after casting the ingot was fluid at this point, and was readily permeated by the copper.

Probably what has occurred in the ingots described is that upon adding the copper which is poured on to the top of the ingot a pipe is formed, and the copper is forced into this by pressure. As the ingot cools down, more pipe is formed; the copper still remains fluid, and keeps such pipe portion filled. As, however, the copper contracts more than the steel, the cavity formed by piping draws upon the supply of molten copper at the top of the ingot. This expands or rises slightly upon setting; nevertheless it contracts more than the surrounding steel. Apparently the contraction of the copper and iron do not take place in the same relative proportion as might be expected.

FOUNDRY SUBJECTS

To be Discussed by the New England Association.

The New England Foundrymen's Association has issued a complete calendar of the dates of meetings and the addresses to be delivered during the coming year's sessions. The program for the remaining meetings of the year is as follows:

Nov. 13, 1912:—"Recent Phases of Molding Machine Development", E. H. Mumford, Vulcan Engineering Co., New York.

Dec. 11, 1912:—"Modern Methods of Cleaning Castings", representative of W. W. Sly Mfg. Co., Cleveland.

Jan. 8, 1913:—Annual meeting.

Feb. 12, 1913:—"Efficiency in the Foundry", Fred W. Taylor, Philadelphia.

March 12, 1913:—Subject to be announced, Dr. Richard Moldenke, secretary American Foundrymen's Association, Watchung, N. J.

April 9, 1913:—"The Air Compressor and Its Profitable Appliance in the Foundry", A. F. Murray, Blake & Knowles Steam Pump Co.

May 9, 1913:—Subject, to be announced. Henry Marquette Lane, Detroit.

The meeting on Oct. 9 was addressed by Thomas D. West, of Cleveland, on the subject of "Loss of Art and Skill in Founding".

The officers of the association this year are: Chas. A. Newcomb, Dean Steam Pump Co., president; Robert C. Bird, Broadway Iron Foundry, vice president; Geo. H. Gibby, Gibby Foundry Co., treasurer; Fred F. Stockwell, Barbour-Stockwell Co., secretary. Executive committee is made up of Chas. L. Nutter, Old Colony Foundry Co.; Chas. A. Reed, Hickman, Williams & Co.; J. C. Hosford, Magee Furnace Co.; D. K. Bartlett, Builders' Iron Foundry; A. L. Clark, American Brake Shoe & Foundry Co.

The meetings are held in the Exchange Club, at Milk and Batterymarch streets, Boston, and are usually followed by a dinner.

Manufactures Heating Equipment

The Hudson Boiler Mfg. Co., 27 West Forty-second street, New York, recently incorporated, advises that it was organized for the purpose of manufacturing and selling cast iron house-heating boilers, radiators, etc. At the present time, the company is having its boilers and radiators manufactured for it under contract. Howard T. Gates, formerly secretary and general sales manager of the McCrum-Howell Co., and Geo. L. Greenman, formerly assistant manager of sales of the McCrum-Howell Co., is secretary and treasurer of the new company. Edward C. Fox, Jas. D. Brady and B. F. Lane are also associated. The new company's operations will be confined to territories east of Chicago.

PROSPECTS GOOD

For Lake Superior Corporation, States President Drummond.

At the annual meeting of the stockholders of the Lake Superior Corporation, held in Camden, N. J., Oct. 2, the following directors were elected: T. J. Drummond, J. Tatnall Lea, Frederick McOwen, J. Frazer Taylor, Walter K. Whigham, Herbert Coppell, Joseph S. Dale, John T. Terry Jr., D. C. Newton, W. E. Stavert, Herbert E. Price and Thomas Gibson. The board subsequently organized by the election of the following officers: President, T. J. Drummond; vice presidents, J. Tatnall Lea, Walter K. Whigham and J. Frazer Taylor; secretary, Thomas Gibson; treasurer, A. H. Chitty.

After the annual report was approved, President Drummond gave a very optimistic address on the outlook of the company. "I would say that we have reached the point where the decks are cleared physically and financially and we are looking forward shortly to increasing returns," he said. "We feel justified in saying to you that the Lake Superior Corporation and its subsidiary companies, both from the operating and from the financial point of view, are on a solid basis with the future well assured."

Issues Annual Report

The Pittsburgh Steel Co. has issued its report for the year ended June 30. The income account compares as follows:

	1912.	1911.
Sales, etc.	$11,649,149	$11,774,356
Expenses	10,337,595	10,507,104
Net earn.	$1,311,554	$1,267,252
Other income	10,019	5,924
Total income	$1,321,572	$1,273,176
Charges	21,185	191,669
Surplus	$1,300,388	$1,081,506
Dividends	1,031,117	741,899
Surplus	$269,271	$339,608

PROGRAM ANNOUNCED

For 11th Annual Convention of Machine Tool Builders.

The eleventh annual convention of the National Machine Tool Builders' Association will be held at the Hotel Astor, New York City, on Oct. 16, 17 and 18. The first session on Oct. 16, after registration of members, will open at 10 a. m. Chairman Charles E. Hildreth will report for the membership committee and the remainder of the session will be devoted to announcement of convention committees, reports of officers, etc.

The second session will open at 2 p. m., when the following program will be observed:

Address: "Export Trade," by W. A. Viall, of the Brown & Sharpe Mfg. Co., Providence, R. I.

Address: "The Use of an Association Catalog in the Development of Foreign Markets," by Stanley H. Bullard, of the Bullard Machine Tool Co., Bridgeport, Conn.

Address: "How United States Patents Might be Made of Greater Value to Patentees," by Samuel W. Banning, of Banning & Banning, Chicago.

The convention will assemble Oct. 17, at 10 a. m., when these addresses will be delivered:

Address: "What We Should do in the Way of Influencing Tariff Legislation," by Frederick A. Geier, of the Cincinnati Milling Machine Co., Cincinnati.

Address: "How Could the Association be Benefited by the Formation of a Mechanical Section?" by E. J. Kearney, Kearney & Trecker Co., Milwaukee.

The fourth session will be devoted to meetings of various committees at hours specified in the afternoon, these including the committees on lathes, sensitive drilling machines, boring machines, gear cutting machines, grinding machines, hand screw machines and planing machines.

Further committee meetings will be held during the morning of Oct. 18, these including committees on radial drilling machines, milling machines, shaping machines, vertical drilling machines and turret lathes.

The sixth session will open at 2:30 p. m., when reports of the convention committee, suggestions by members as to work of the association, etc., will be heard. Officers will be elected at this session.

The question of changing the name of the association will probably be called up at the convention. At the spring meeting in Atlantic City it was suggested that the name be changed to "The American Metal Working Machinery Constructors' Association". Some dissatisfaction has been expressed over the use of the present name as it is claimed to misrepresent the work of the society.

THE IRON TRADE REVIEW

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Labor Conditions and Problems

Two recent addresses have had important bearing upon the advisability of adopting shorter hours of labor than prevail in many manufacturing concerns of the country. President Farrell, of the United States Steel Corporation, in his address at Lorain, Sept. 28, made it very clear that the Steel Corporation does not care to take any backward step in its policy of enlightened treatment of its employes. The paragraph in the address relating to the six-day week was especially significant. "The fact," said Mr. Farrell, "that some of our employes accept employment elsewhere because of opportunity to work seven days continuously per week, as compared with our policy of operating our plants six days, leaving the seventh, or Sabbath day, for such observance as best suits the individual, does not alter our belief that the six days' continuous week is sufficient and best for the interests of all."

This declaration again calls attention to the fact that in the introduction of the shorter work day and the six days' continuous week, one of the principal obstacles encountered is the opposition of employes. The extent of this opposition is not realized by many well-meaning people, who criticize employers for not more rapidly improving the conditions of employes in various industries. But even when it needs many more men than it has on its pay rolls, the Corporation will not change its policy and its influence will be widely felt.

Another very important contribution to the discussion of industrial conditions was made by R. A. Bull, of the Commonwealth Steel Co., Granite City, Ill., at the Buffalo convention of the American Foundrymen's Association, in his paper on the twelve-hour shift in the steel foundry, giving the results of its abandonment in the open-hearth department of the company and the substitution of an eight-hour shift. Unfortunately, in the past, advocates of abandoning the twelve-hour day have been confined largely to sensational magazine writers, who had little, if any, practical knowledge of working conditions, and to sociologists—many of them men and women of high character and the purest motives—who have often had little more real knowledge than the muckrakers. Against these reformers have been arrayed a large number of manufacturers, many of whom honestly believe that it would be ruinous to attempt to abolish the twelve-hour day. Of course, some progress has been made in introducing the shorter day. The Cambria Steel Co. has done much in this direction, but as yet the practical demonstrations of the desirability of the eight-hour shift, as compared with the twelve-hour shift, have not been made public in a convincing manner. When, therefore, a man of the standing of Mr. Bull gives an array of concrete facts, which we publish elsewhere in this issue, showing the highly satisfactory results of the change from the long to the short day, his conclusions are entitled to the highest respect and are bound to have far-reaching influence. We commend the careful perusal of Mr. Bull's paper to all our readers.

Mr. Bull does not pose as a philanthropist, although he says, "There is no small amount of inward satisfaction in the knowledge that we have done a humane thing." He gives in detail the results in actual practice and declares that he is satisfied that any careful comparison along the lines which he indicates will convince any steel manufacturer of the wisdom of operating with three eight-hour shifts, purely from an economic standpoint. "Speaking for the people with whom I am associated," he says, "we are greatly pleased with the change." Fears as to the demoralizing effect upon other workmen have not been realized. He declares that "the basic principle of the eight-hour day is absolutely sound and rests on the incontrovertible fact that you cannot expect any man to give you the best that is in him when you keep him employed without intermission for twelve hours per day, seven days per week, at work making a heavy demand upon his mental and physical powers, under conditions of high temperature, such as obtain on the furnace floor. To expect the best results under such circumstances is folly, and to continue operating under them spells not the title of this paper, but the costly side of the twelve-hour shift."

Closely connected with the movement for shorter hours is the present labor scarcity in this country, which is likely to check the movement. From all parts of the country come reports of the extreme difficulty experienced in getting labor in all kinds of work, especially on farms and in factories. Probably more women are working today in corn fields than ever before in the history of the country, and practically all industries could employ more men if they were able to get them. Correspondence recently carried on by the Brier Hill Steel Co., Youngstown, with the Bureau of Labor at Washington, and with various

consular representatives of the United States in foreign lands, shows the seriousness of the labor situation and the difficulty of improving it. As long as this labor shortage continues, it will be extremely difficult to reduce the hours of labor or to make progress in the introduction of the six-day week. But the testimony of such men as Mr. Farrell and Mr. Bull is nevertheless important, and no one who believes that humanity is progressing toward better conditions can doubt that slowly but surely conditions more favorable to the right kind of living will prevail in the manufacturing plants of the country.

Steel Prices Here and Abroad

Statements last winter that prices of a number of steel products were lower in the United States than in England and on the Continent did not receive the credence they deserved, and in view of the material advances which have since occurred in our domestic market, it is quite certain that the general public does not now recognize the lowness of American prices as compared with those prevailing abroad. We are more or less in the habit of holding the view that price fluctuations abroad are extremely narrow, by no means as marked as those which occur in our own market.

The fact is that there has been a very substantial rise in prices abroad. In England the prevailing pig iron prices average about 20 shillings above those of a year ago, which is double the rise which has occurred in the United States. Concurrent advances in finished products range from 18 shillings in rails to 25 shillings in plates and structural shapes and 30 shillings in bars. Here are advances of $4.50 in rails, when our rail price has not advanced at all, and an average advance of about 30 cents per 100 pounds in plates, shapes and bars, no less an advance than has occurred in the United States. In Germany, prices have been advancing even more markedly.

As a result, we find the average prices of pig iron, billets, sheet bars and finished steel in England and Germany approximately the same as the average in the United States. Plates and shapes in England command fully £8 per gross ton, or 1.37c per pound, which is far above our own prices. In Germany, merchant steel bars are bringing 1.40c for early delivery in the domestic market and above 1.30c in the export market.

These are relatively new conditions, as compared with the average condition in the 12 years from 1899 to 1910, inclusive. As regards finished steel, they may almost be said to be entirely new. In the middle nineties, and until the American boom of 1899, certain products sold at lower prices in the United States than abroad, but these were the cruder materials. At that time, heavy exports occurred of pig iron, particularly southern, and of billets, sheet bars and rails from northern plants. There was relatively little movement in the more finished products.

A great change has occurred in the alignment since the middle nineties, arising from the fact that in the United States the spread between crude and finished product has decreased, and a similar change in the spread has not occurred abroad. Thus it is that while in the middle and late nineties we could advantageously export pig iron and unfinished steel, but could export the finely finished products only with difficulty, now we export relatively little of the cruder materials and a great deal of the finely finished products.

The result of the present situation is that our steel exports are very large, and would be still larger if we had better transportation facilities. The steel mills are not "dumping" their product abroad. In many cases, they are realizing higher prices, f. o. b. mill, than they are obtaining on shipments made at the same time for the domestic market. These cases may not constitute the average, but this much can be said with certainty. that the average prices, delivered abroad, are higher than the average prices delivered in the United States.

What Will It Do?

With the re-assembling of the Interstate Commerce Commission there begins as serious a year's work as that body has ever had. Nearly two years have now elapsed since its decisions in the great advanced rate cases, and the time has not brought a full solution of the problem. The railroads have not abandoned their claim that they need, and are entitled to, an important increase in revenue through higher rates. The burden was placed upon them of placing themselves in satisfactory position to serve the public without advancing rates. They have not done so, since a great car shortage is impending. What will the Interstate Commerce Commission do when the condition of a car shortage fully develops?

Iron and Steel Are Comparatively Cheap

Record high prices for both pig tin and spelter recently attained, direct attention anew to the moderate prices which prevail for pig iron and finished steel, despite the fact that the market has been advancing since early in the year. Pig tin at 50 cents, New York, is just four times the price it commanded at the low point in the late nineties, and spelter at 7½ cents, East St. Louis, is almost twice as high as it has been at some times in the past.

Both pig iron and steel prices are far below the highest prices which have obtained in several periods in the past dozen years, and are not, in point of percentage, very much above the lowest point on record. The advance has really been a very moderate one, although it has naturally been a great relief to producers to pass above the practically profitless level which prevailed in the winter.

Pig iron, on an average, is only about $3 a ton higher than at the low point last winter, when prices were the lowest since 1904, and finished steel has advanced at the same time only about $5 a ton. The present level falls considerably short of being midway between the 1907 high level and the low level of last winter. The advances this year have been remarkable only by comparison with the difficulty iron and steel has usually experienced in the past in working up to a better level, even when conditions were altogether favorable. In the metals and in many other commodities, the response is frequently much more prompt.

Power of Corporation Not Alarming Willis L. King

Who Smilingly Replies to Suggestion of Possibility of Crushing Competitors--Snyder, Follansbee and Others Testify at the Hearing

With the resumption in Pittsburgh last week of the taking of testimony in the suit of the government for the dissolution of the United States Steel Corporation, the witnesses were questioned along the same general line of inquiry pursued in the hearings in New York last May, June and July. The subjects so far entered into in Pittsburgh include: The conditions existing and the events which took place immediately before and after the formation of the American Tin Plate Co., American Sheet Steel Co., American Steel Hoop Co. and National Tube Co.; the purpose of the so-called "Gary dinners"; the contracts entered into between manufacturers of rolls and the American Sheet Steel and American Tin Plate companies; the ore holdings of the Steel Corporation; the freight rates charged by ore railroads owned by the Steel Corporation; the purchase of the Union Steel Co.; the extent of the coking coal holdings of the H. C. Frick Coke Co. and others.

The witnesses who submitted the most interesting testimony last week were: James A. Campbell, president of the Youngstown Sheet & Tube Co.; W. P. Snyder, of W. P. Snyder & Co., Pittsburgh, and Charles A. Painter, formerly president of the J. Painter & Sons Co., Pittsburgh. Mr. Campbell explained that the purpose of the "Gary dinners", according to his understanding, was to give greater stability to market prices. He also stated that he thought 45 cents would be a sufficiently remunerative rate for the Steel Corporation and other roads to charge for the transportation of Lake Superior ores from the mines to Lake Superior ports. Mr. Snyder testified that in his opinion the ore holdings of the Steel Corporation were not any larger than ordinary business prudence would demand. He also explained the method of conducting the billet pool which existed more than a decade ago. Mr. Painter fully explained conditions in the steel hoop and cotton tie industry prior to the formation of the American Steel Hoop Co., and also how the securities of this company were underwritten. Julian Kennedy, one of last week's witnesses, made a statement to the effect that the Steel Corporation has sufficient power to put all of its competitors out of business, should it desire to do so. Mr. Kennedy, however, did not submit any reasons for this belief further than to state that the Steel Corporation's advantage over its competitors was its ability to transport materials cheaply over its own railroads.

The witnesses have so far been examined on the average of a fraction over four a day. If this rate is continued, it is believed that the hearings in Pittsburgh will end well before the end of October. An adjournment of about a week, for the examination of a considerable amount of documentary evidence, will then be taken, after which hearings will be held in Cleveland, Chicago, Washington, and probably other cities. The hearings in Pittsburgh have aroused considerable interest among iron and steel manufacturers in that locality, who have been attending them in number. The examination of the witnesses so far in Pittsburgh has proceeded very quietly, without any of the altercations between the opposing counsel, which occasionally featured the hearings in New York.

Mr. Follansbee Continues

D. G. Follansbee, whose testimony on Tuesday was reported in last week's issue of THE IRON TRADE REVIEW, was further cross-examined on Wednesday by David Reed Jr., in connection with the assignment of brands by tin plate dippers to the American Tin Plate Co. Mr. Reed wanted to know if this method of assigning was not an old custom in Wales prior to the time it was adopted in this country by the American Tin Plate Co. The witness said that he had no knowledge of this being the case.

Judge Dickinson then inquired further into the matter of making assignments of brands and wanted to know whether this custom was not a harmful one to the dippers. Mr. Follansbee briefly answered this by saying that his company had not been harmed through assigning its brands.

James A. Campbell, president of the Youngstown Sheet & Tube Co., Youngstown, O., after telling of the various capacities in which he had been engaged by various concerns during the course of his business career, was questioned as to the various committees which were formed at one of the early "Gary dinners."

"A general committee was formed," said Mr. Campbell, "which I think was made up of Willis L. King, E. A. S. Clarke, John A. Topping and C. M. Schwab."

Mr. Campbell Testifies

Mr. Campbell then went on to say that he was a member of the sheet and tin plate committee, the pipe and tubular goods committee and the plate and billet committee. Of the first Messrs. Dinkey, Topping and Clarke were also members; of the second, W. B. Schiller, C. R. Hooper and Messrs. Scott and Smink; of the third, Messrs. Scott, C. W. Bray, C. M. Hart and J. C. Niedringhaus.

"What did you understand was the object of this dinner?" asked Judge Dickinson.

"I didn't know until after the meeting," said Mr. Campbell.

"What did you then understand it to be?"

"From the remarks made by Judge Gary, I understood that the object of the dinner was to bring about greater stability in prices."

"What was the object of appointing the various sub-committees which you have mentioned?"

"The same object—greater stability in prices."

Course of Procedure

"What was your method of proceeding as chairman of a sub-committee?"

"I would ask those present to make remarks on the amount of business which was being taken, the prices quoted, cost of production and on all relative topics. After talking over all the matters thoroughly, those present would make announcements as to the prices which they thought fair. Thus a market price would be formed."

"Was this always upheld?"

"Not always."

"Were any penalties exacted from those companies which, after announcing that they would uphold a certain price, failed in doing this?"

"This was never done. We had no hold whatsoever upon any of the manufacturers and they were free to do as they pleased."

"Were they ever required to make explanations for underselling the market?"

"We generally asked those manufacturers who had sold below the market price as to their reason for doing this."

"What kind of explanations were offered?"

"Well, some would say they had made a mistake in freight rates or that their sales manager had made a mistake," said Mr. Campbell.

"Then price cutting was done not on purpose but by mistake?" queried Judge Dickinson.

"So it seemed."

Mr. Campbell did not hesitate to state that he believed these meetings to be of great benefit to the manufacturers. They came to an end, he said, some time in 1911.

As to Ore Holdings

Mr. Campbell was questioned as to the ore holdings of the Youngstown Sheet & Tube Co. on the Mesabi range. His company, said the witness, owned 60 per cent of the stock of the Crete Mining Co., which had taken over several ore properties on a royalty and bonus basis. The largest property, Mr. Campbell estimated, contained about 6,000,000 tons of ore on which a royalty of from 25 to 30 cents was paid. The Crete company received a bonus of $150,000 for exploration work.

The witness was then questioned as to whether the railroad freight rate on ore of 80 cents from the mines to Lake Superior ports operated to his company's disadvantage as a competitor of the United States Steel Corporation. Mr. Campbell stated that it decidedly did, as the Steel Corporation thus secured profits at its competitors' expense. Mr. Campbell was here taken in hand by Mr. Bolling, who tried to disqualify him, but with little success, as an expert on ore freight rates. The witness then said that, taking into consideration the mileage, the grade, etc., of the Steel Corporation's roads, he believed that 45 cents would be an amply remunerative freight rate.

Mr. Campbell was then questioned in regard to other freight rates in force, especially to and from the Youngstown district. He stated he believed these generally to be too high, but he would not mention what he thought were reasonable figures. He did not wish to give out this information because of the complaint against certain railroads which his company had lodged with the Interstate Commerce Commission on the ground that the rates charged on coke, ore, etc., were too high.

In further cross-examination, it was brought out that the 80-cent freight rate on ore from the Mesabi range to Lake Superior ports had been in effect since long before the Corporation was organized; also that the reduction to 60 cents, which went into effect at the opening of navigation this year, was instituted voluntarily by the Steel Corporation; further, that the 80-cent rate had been charged by the Great Northern and the Soo roads until this year, when they followed the lead of the Steel Corporation road in reducing the rate to 60 cents.

Tribute to Judge Gary

During the cross examination of James A. Campbell, president of the Youngstown Sheet & Tube Co., the witness was questioned by Raynal C. Bolling as to the growth of the Youngstown company since the Steel Corporation was organized, the purpose being to show that competition with the Steel Corporation has not injured it. "The competition between his company and the Steel Corporation subsidiaries, although brisk and vigorous at all times," said Mr. Campbell, "is of the fairest and most desirable kind." Mr. Campbell stated that the spirit of fair play on the part of the Corporation has been especially noticeable during the past seven or eight years, during which period Judge Gary has been the moving spirit. He said that since the formation of the Steel Corporation the smaller manufacturers of iron and steel have been more prosperous than ever before and he attributed this fact mainly to the broad minded policies of Judge Gary.

"If Judge Gary should die tonight," said Mr. Campbell, "a good many steel manufacturers would lie awake nights."

Julian Kennedy's Testimony

Julian Kennedy, Pittsburgh, eminent consulting and mechanical engineer, was examined by Judge Dickinson in regard to his part in reporting the valuation of a large number of tube manufacturing plants to J. P. Morgan & Co., New York, prior to the formation of the National Tube Co. This report contained the results of a tour of inspection of the various plants by Mr. Kennedy and was signed by him. The witness produced a copy of the report and this, with the consent of Steel Corporation counsel, was entered in the record. Some of the companies mentioned in this report were not subsequently taken into the National Tube Co. Then Judge Dickinson asked the witness some questions as to what effect the raising and lowering of the price of pig iron would have on the prices of finished iron and steel products. Some points in the testimony submitted by J. A. Campbell were then taken up.

"Do you think, as an engineer, who has made a study of freight rates, that a rate of 45 cents on ore from the Mesabi range to Lake Superior ports would be profitable?" asked Judge Dickinson.

"I think it would be sufficiently remunerative," answered Mr. Kennedy.

"Do you think the Steel Corporation had an advantage over its competitors through charging this rate for the transportation of ore over its road?"

Mr. Kennedy said it had, but he was not prepared to go into details as to the extent of this advantage.

Judge Dickinson then switched off into the manufacture of tin plate.

"Can a plant having 10 or 12 mills manufacture tin plate approximately as cheaply as a plant having more mills?"

"It can."

Talked Conneaut Project

Judge Dickinson next took up the projected tube plant of the Carnegie Steel Co. at Conneaut, O., and questioned the witness on this subject. This line of inquiry drew forth objections from the defense, who claimed that Mr. Kennedy had only hearsay knowledge of the project.

In cross-examination by C. A. Severance, the latter questioned the witness regarding the weight of rail, weight and capacity of cars, of locomotives, cost and capacity of docks, cost of construction, nature of the country and other details respecting the Steel Corporation's roads in the Lake Superior region, with the evident intention of proving that the witness was not in a position to say anything authoritative about what the freight rate should be. The witness did not personally have knowledge of any of the matters thus called for and he finally admitted that his rate of 45 cents was based only on the fact that, according to his understand-

ing, the operating expenses of the road were 30 per cent of gross receipts.

Mr. Severance then endeavored to disprove Mr. Kennedy's statement that about 85 per cent of the tube works of the country, as described in his report to J. P. Morgan & Co., had been taken into the National Tube Co. The witness said that his figure of 85 per cent was not an accurate calculation, but a general percentage which has been in his head for about 15 years. He was not prepared to give an accurate figure, he said.

Mr. Severance then questioned the witness' assertion that the Steel Corporation was powerful enough to put all its competitors out of business if it wished to do so.

"Could the Jones & Laughlin Steel Co. be put out of business if the Steel Corporation wished to effect this?"

"Yes."

Exist by Sufferance

"Could the Pennsylvania Steel Co., with half its stock owned by the Pennsylvania railroad, be put out of business by the Corporation?"

"It could be kept alive by money from the railroad, but not by its ability to compete with the Steel Corporation."

"Then all these independent companies exist on sufferance of the Steel Corporation?"

"Yes sir."

"What is your definition of competition?" asked Mr. Severance.

"The ability to quote a lower price than your competitor."

"Anything else enter into it?"

"Yes, lots of other things, quality, etc.," said Mr. Kennedy.

Mr. Severance again took up the discussion of matters concerning the railroads owned by the United States Steel Corporation. Mr. Kennedy said he thought a corporation had no right to own a common carrier. His testimony in this connection was on exactly the same lines as that submitted before the Stanley congressional committee.

The witness was then further cross-examined by Mr. Severance in reference to the statement that the Steel Corporation, if it desired to do so, could put all its competitors out of business. Mr. Kennedy was evidently somewhat perturbed and finally said that the sole advantage which the Corporation had over its competitors was its ability to transport its raw materials cheaply over its own railroads. This reply appeared to afford satisfaction to the Steel Corporation counsel, who pointed out that the question of freight rates was one to be decided by the Interstate Commerce Commission.

"Since the formation of the Steel Corporation, you have invested your money in other iron and steel companies, have you not?" asked Mr. Severance.

"Yes," replied the witness.

"So, you have not been afraid of being wiped off the map?"

"No, sir."

"That's all."

B. G. FOLLANSBEE
President of Follansbee Bros. Co., Testifying at Steel Hearing

J. C. Seaman Testified

Joseph C. Seaman, president of the Seaman-Sleeth Co., Pittsburgh, Pa., was asked about a contract, entered into in 1898, in which his company agreed to sell tin plate mill equipment to no concern but the American Tin Plate Co. This contract, which was executed in Chicago, by Mr. Seaman, was not produced, owing to the fact that the witness had no copy. He was asked to state briefly the contents of this contract from memory. It was agreed in this document, said Mr. Seaman, that the makers of rolls were to furnish all the rolls used by the American Tin Plate Co., on condition that they accepted orders from no new concerns. They were left free, however, to do business with independent tin plate concerns already in existence. The contracts were designed to cover a three year period and were signed by Seaman, Sleeth & Co.; A. Garrison Foundry Co., Lincoln Foundry Co., Totten & Hogg Iron & Steel Foundry Co., Lewis Foundry & Machine Co., Mesta Machine Co., Frank-Kneeland Machine Co., Chilled Roll Foundry,, Lloyd Booth Co., Youngstown Foundry Co., Riverside Foundry Co. and the Avonmore Foundry & Machine Co.

David Reed Jr., in cross-examination, endeavored to show that a number of other concerns were able to make tin plate rolls at that time. He mentioned the Canton Roll & Foundry Co., the William Tod Co., Farrell Foundry & Machine Co., Birdsboro Steel Foundry & Machine Co., Newbold Brothers, Philadelphia Roll & Machine Co., and the Hyde Park Foundry. The witness was not sure that all these concerns made rolls or even that all of them were in existence at the time. Allis-Chalmers Co. was also mentioned as a concern that was suitably equipped for manufacturing rolls. Mr. Seaman mentioned a

meeting of the roll manufacturers in New York in 1902, when Charles M. Schwab, of the Steel Corporation, told them that the contract must be cancelled immediately.

Weil Cancels Contract

A. Leo Weil, of Pittsburgh, formerly counsel for the American Tin Plate Co., who drew up the contracts executed between the American Tin Plate Co. and the manufacturers of tin plate mill equipment, was asked to produce copies of these contracts. This, after the rights of the American Sheet & Tin Plate Co. had been waived by Mr. Reed, Mr. Weil replied that he was unable to do. Mr. Weil told how, at the insistence of President Schwab, he took the roll foundrymen to New York and spent the greater part of a week in getting the contracts cancelled.

George A. Hogg, of Pittsburgh, formerly of the Totten & Hogg Iron & Steel Foundry Co., and of the George A. Hogg Iron & Steel Foundry Co., but now retired, was also questioned about these contracts. He was unable to present much information beyond the fact that his company had entered into such a contract. A similar contract was entered into by his company with the American Sheet Steel Co.

William A. Herron, of the Lewis Foundry & Machine Co., also told of meetings in New York and Pittsburgh, attended by manufacturers of tin plate rolls. On two of these occasions, they conferred with either Daniel G. Reid or W. B. Leeds, of the American Tin Plate Co., and this resulted in drawing up a contract whereby the roll manufacturers were to supply all the equipment for the American Tin Plate Co. on condition that they did not furnish equipment for any new companies that might be formed. They were not restricted, however, in doing business with independent tin plate concerns then in existence.

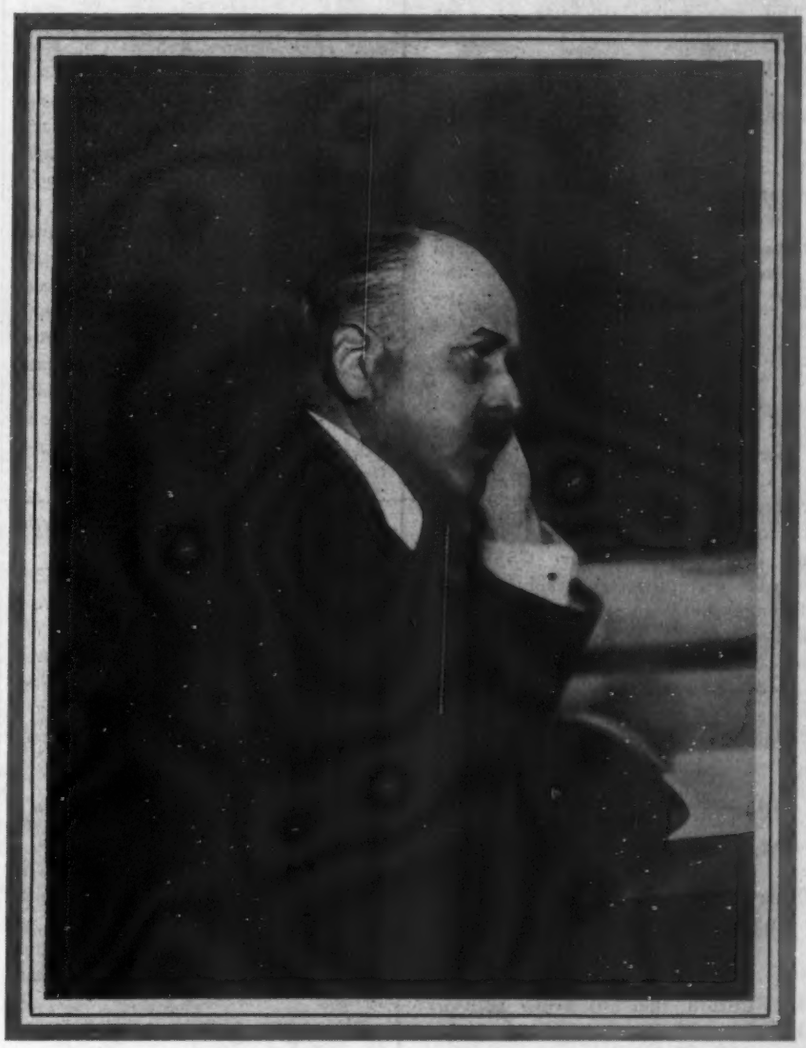
Henry C. Shaw, president of the A. Garrison Foundry Co., and formerly vice president of the Lewis Foundry & Machine Co., was also questioned about contracts entered into by the latter concern and the American Tin Plate Co. and American Sheet Steel Co. He knew of the existence of these contracts but had no part in the signing of them. The terms of these contracts, he said, were the same as those described by the previous witnesses.

A number of other roll manufacturers had been subpoenaed to testify as to these contracts but it was agreed by the opposing counsel that enough information had been secured on this subject, and the other roll manufacturers were then dismissed without making an appearance on the stand.

Coke Works Absorption

J. P. Brennan, president of the Thompson-Connellsville Coke Co., and formerly general superintendent of the McClure Coke Co., which later became part of the H. C. Frick Coke Co., went on the stand in the afternoon to testify regarding the taking over of the McClure company by the Frick company. Following the completion of this transaction the Frick company, the witness said, controlled about 75 per cent of the coking coal land in the Connellsville section. There were about 18,000 or 20,000 ovens in the old Connellsville section in 1910, he said. At that time the "Klondike region" had not as yet been developed.

Charles A. Painter, now president and manager of a brokerage house in Pittsburgh, testified, in reply to H. V. Colton's questions, that he first went into business in 1884 as assistant secretary of the J. Painter & Sons Co., which manufactured hoop and band iron, cotton ties, etc. He mentioned a number of concerns, including the Union Iron & Steel Co., Youngstown, O.; William Clark & Sons Co.; Lindsay & McCutcheon Co.; P. L. Kimberly & Co.; Monessen Steel Co.; A. R. Whitney & Co.; the Illinois Steel Co.; H. P. Nail Co., and others, which were its competitors.



CHAS. H. BOOTH
Vice President of United Engineering & Foundry Co., as a Witness

"Were you connected with a company of the name of the Export Co.?"

"Yes, sir, one of the directors."

"What was that company?"

"We got this company up after the panic of 1893 to go after foreign trade. It was formed and regularly incorporated. The different manufacturers did it so as to handle their

foreign trade as a unit, instead of each one of these different companies going abroad and having the expense of its agents in breaking into the foreign trade. We ran it along very successfully until the boom came along, when the American prices were higher than English prices."

"What companies joined in that export company?"

"J. Painter & Sons, Lindsay & McCutcheon, William Clark & Sons, A. R. Whitney and, I think, the Pomeroy company."

"Did you make any use of your export company at any time in connection with domestic business?"

"It sometimes took orders in America, the same as it would take them abroad."

Mr. Painter explained how the company was operated. The Export Co. would take an order and then the material would be manufactured by the company interested in the export company which quoted the lowest price. The witness thought the tendency of doing business this way was to lower prices at home, since the quoting of low prices on export business led to the quoting of low prices on domestic business. The Export company also prevented the members from competing with each other, except within the company itself. The Export Co. made a profit generally, representing the difference between its selling price and the price at which the manufacturer filled the order. The profit was, of course, divided up among the manufacturers.

"This was all worked out scientifically?" interjected Mr. Lindabury.

"We were groping in the dark, finding a way of getting more business. The government could not tell us how to do it. Whom could we go to?" answered Mr. Painter.

Hoop Business

Mr. Colton then took up the organization of the American Steel Hoop Co. The witness said that he helped Mr. Guthrie get the options on the different plants by introducing him to the different manufacturers.

"Did you ever see the underwriting agreement relating to the organization of the American Steel Hoop Co.?"

"Yes, sir."

"Did you subscribe to it?"

"My uncle did."

"For every $100 in cash you got $100 in common, par value, and $100 of preferred, par value?"

"Yes," said the witness, with a remark to the effect that Mr. Colton was "putting the cart before the horse."

"Was that according to habit?" asked Mr. Severance, referring to the method of underwriting.

"Yes, according to habit and custom."

Mr. Painter stated that the options on the plants were for a cash purchase and that membership in the underwriting syndicate was allowed merely by courtesy. J. Painter & Sons were let into the syndicate to the extent of only about 25 per cent of the selling price.

"Now, get this through your head, Mr. Colton," said Mr. Painter, in explaining the underwriting of the Steel Hoop securities, "it was a privilege to be able to underwrite the securities of the American Steel Hoop Co. and a great number of my friends came to me and begged me to use my influence so that they might get into the deal."

Mr. Painter explained that the sale of the Isabella furnace was conducted as a transaction separate from the sale of the J. Painter & Sons Co. For the Isabella furnace, $1,250,000 were paid. The Painter company and Spang, Chalfant & Co. each had a half interest in this furnace.

Mr. Whitla's Testimony

J. P. Whitla, Sharon, Pa., attorney for the Sharon Steel Co. from 1899 to 1900, and also a stockholder in that concern, was questioned by Judge Dickinson, of government counsel, in regard to the merging of the Union Steel Co., of which Wm. H. Donner was president, and the Sharon Steel Co. in 1900. He stated that the latter concern was completing a tube mill and a universal plate mill at that time. Shortly afterward, in 1901, 12 50-ton open-hearth furnaces were also put in operation.

"State whether either the Sharon or Union Steel companies, at the time of their sale to the United States Steel Corporation, had under construction any new open-hearth furnaces."

"I do not recall exactly, but I think it was planned to add four or five more to the Sharon plant."

Mr. Whitla then went into further detail regarding the equipment of the Sharon Steel Co. Its products, both prior to and after the merger, included blooms, slabs, billets, sheet and tin bars, rods; plain, galvanized and barbed wire and wire nails. It also owned a majority of stock in the Sharon Tin Plate Co. and the Sharon Sheet Steel Co., thereby controlling the sale of a considerable output of both sheet steel and tin plate. Mr. Whitla stated that the Sharon company was solvent when it was merged with the Union Steel Co.

"How came you to sell out to the Steel Corporation?" asked Mr. Lindabury, who took up the cross-examination.

"The men who directed the company were anxious to sell, because of their other business interests which demanded most of their time, and, being offered a good price, they were glad to take advantage of it."

"How was the price fixed?"

"The properties were sold at a price based upon the actual values of the various properties, as determined at the time of the merger

Examined the Examiners

Charles A. Painter, formerly president of J. Painter & Sons Co., later vice president of the American Steel Hoop Co., and now at the head of a brokerage house in Pittsburgh, is a rosy-cheeked, well-set-up man, who looks and acts much younger than he really is. He is very emphatic in his speech and manner and radiates health and energy at every pore. As a witness, he was inclined to answer questions with a wealth of detail, with the result that the attorneys who questioned him would occasionally endeavor to cut him off. At such times he would raise his hand and say, "Wait a minute, we want to get this right," or "Now, we want to get the truth of this." Judge Dickinson was plainly bored at this method of proceeding.

The witness was asked by Mr. Colton if prices were higher in a certain year than in the year previous. He replied that they were and endeavored to explain why, but was interrupted. Shortly after, he was turned over to David Reed Jr., who immediately requested an explanation of the rise in prices in that year.

"Oh," remarked the witness, "so that's the way you do it here."

"Put that uncalled-for remark in the record," interjected Judge Dickinson sternly.

"I beg your pardon, judge, I didn't mean to offend you," said Mr. Painter.

"Oh, it's nothing personal," answered Judge Dickinson shortly.

of the Sharon and Union Steel companies."

Mr. Whitla said that he thought the price a modest one, which, however, was satisfactory. He said that he did not believe the price of $5,000,000, paid for the Sharon company's ore holdings on the Mesabi range, was excessive as this reduced itself to only 25 cents per ton for ore in the ground.

The witness was then asked as to who was present at the meetings of the wire nail pool prior to the year 1902. He named a great many concerns whose representatives were present but said he never met any one present from the American Steel & Wire Co. Mr. Whitla said that as far as he knew, the consolidated Union Steel Co., at the time of its sale to the United States Steel Corporation, had the largest output of wire nails of any of the independent companies.

Tried Hand at Exporting

F. L. Clark, of Pittsburgh, formerly president of the William Clark Sons Co., but now retired, was questioned about the state of competition existing among hoop and band makers prior to the time of the formation of the American Steel Hoop Co. He mentioned a large number of manufacturers of cotton ties, hoops and bands, including the Jones & Laughlin Steel Co., which, while not regularly making these products, had the capacity for turning out a larger output than all the regular manufacturers of these products combined. The companies which went into the American Steel Hoop Co., said Mr. Clark, controlled about 50 per cent of the country's capacity for producing cotton ties, about 5 or 10 per cent of the capacity for making common iron bars and less than 50 per cent of the capacity for making hoops and bands.

It was brought out by David Reed Jr., in the cross-examination, that the American Steel Hoop Co. at the time of its organization could supply over twice the country's demand for steel hoops in dull times and that the independent companies making steel hoops alone could produce two and one-half times the country's demand in dull times. Thus the American Steel Hoop Co. always had plenty of competition.

Henry B. Lupton, formerly secretary of the Oliver Wire Co., Pittsburgh, was questioned briefly as to conditions and the state of competition which ruled in the steel and wire industry at the time the American Steel & Wire Co. was formed. Mr. Lupton explained how his duties in the office of the Oliver Wire Co. were to act as sort of a general "handshake", to smooth out difficulties with customers. Mr. Lupton's statement that the American Steel & Wire Co. almost entirely controlled the market price of wire and that that concern lowered the price from $3.25 to $2.25 in one day appeared to afford much satisfaction to Mr. Colton.

Mr. Colton questioned the witness regarding a contract which he had mentioned during the cross-examination by Mr. Severance. This was between the Oliver Iron & Steel Co. and the Carnegie Steel Co.

"The Oliver Iron & Steel Co. makes a great deal of coke and supplies this to the Carnegie Steel Co. in return for billets," said Mr. Lupton.

"Then the Oliver company sells all of its coke to the Carnegie company and the Carnegie company in return disposes of all its billets to the Oliver company?"

"No, not all of its billets," said Mr. Lupton, with a smile. "It keeps a few for its own use."

W. P. Snyder on Stand

W. P. Snyder, of W. P. Snyder & Co., Pittsburgh, was questioned in regard to a number of different subjects, chief of them being the ore properties of the United States Steel Corporation in the Lake Superior region.

"If you owned the blast furnaces that the Steel Corporation owns, Mr. Snyder, would you feel that you had enough ore if you owned as much ore as the Steel Corporation owns?" asked Mr. Reed, who conducted the cross examination.

"I would feel that by having more I would be in a safer position. Good iron ore is getting scarce nowadays," answered Mr. Snyder. "The Corporation's holdings are no larger than is demanded by common business prudence."

Mr. Snyder, up to 1899, was president of the Oliver & Snyder Steel Co., which sold billets, slabs, blooms, etc., competing with the Carnegie, Illinois, Jones & Laughlin and a number of other steel companies. This company, along with practically all of its competitors, was a member of the "billet pool", which embraced the manufacturers of billets, blooms and slabs. At times this pool allotted business to its members on the percentage basis; thus for business either in excess of or under the allotted percentage, the various members either paid in or drew out of the pool fund. Mr. Snyder did not remember the basis per ton on which these payments were made.

Mr. Snyder was then questioned about various ore properties on the Mesabi range and the bonuses and royalties paid on these. This information, through his connection with the Shenango Furnace Co., and other companies, he was in an authoritative position to supply. By this testimony Judge Dickinson sought to show that the royalties and bonuses on ore properties have increased greatly since the Steel Corporation was organized.

"What was the average royalty paid on Lake ore from 1896 to 1901?" asked Judge Dickinson.

"From 15 to 25 cents a ton," replied Mr. Snyder. He further stated that the highest royalty during that time was that of 35 cents paid by the Clairton Steel Co. Since 1901, said the witness, there has been an increase to 50 to 75 cents per ton. Mr. Snyder assigned this increase to the increased value of Lake Superior ore, which resulted both from the greater demand for ore generally and the development of furnaces so that lake ore can be used to advantage. In the 90's, he said, furnace men had not yet learned to handle this ore as advantageously as it is used at present.

In regard to the Clairton Steel Co., Mr. Snyder stated that the United States Steel Corporation had secured a bargain when it took over that concern. The Clairton company was then in the hands of a receiver and the sale was made with the permission of the United States court. Mr. Snyder stated that he also made plans at the time to purchase the properties of the Clairton company but that these fell through.

Mr. King's Testimony

The hearings opened Monday morning with John A. Brown in the special examiner's chair, Henry P. Brown being detained in Philadelphia on business. Willis L. King, vice president of the Jones & Laughlin Steel Co., was called to the witness stand and questioned by Judge Dickinson in regard to the difference between various types and weights of rails. Mr. King also explained what is designated by the terms plate, sheet bar, universal plates, angle splice bar, angle, beam, channel, bloom, billet, tie plate and other finished and semi-finished materials. This part of the examination was termed "Mr. King's class in

school" by the counsel for the defense.

Mr. King stated that the largest percentage of steel sold goes out in the form of bars.

The witness said he had heard of a tube plant which the Carnegie company proposed to build at Conneaut, O., prior to the formation of the United States Steel Corporation. Mr. Severance objected to this line of questioning on the ground that the witness had only a hearsay knowledge of this subject.

Mr. King told about the structural and plate associations which existed until 1904, and he admitted having acted as treasurer of both of these. The members of the structural association were the Carnegie, Illinois, Cambria, Lackawanna and Jones & Laughlin steel companies and the A. & P. Roberts Co. The plate association comprised the Carnegie, Illinois, Otis, Cambria and Jones & Laughlin steel companies, Worth Bros. Co. and the Lukens Iron & Steel Co. Colonel Bope represented the Carnegie company at the meetings of both associations, while George Baker represented the Illinois Steel Co. Both associations controlled about 90 per cent of the country's capacity for production. Business in the association was divided up among the members according to the percentage of allotment, based on the capacity for production of each concern as determined from its sales of the three years preceding the organization of the association. The Carnegie Steel Co.'s allotment was 45 to 50 per cent in each pool and that of the Illinois Steel Co. in the plate association was 10 to 11 per cent. The leading figure in the organization of the plate pool was C. M. Schwab, said Mr. King. The various companies in the associations either paid in or drew out sums from the association's funds according to whether their business exceeded or fell short of their allotments.

Continued the Meetings

Following the disbanding of these two pools in 1904, the members of each continued the meetings, but in what they thought was a less objectionable form. At these meetings prices were discussed and those present would practically agree to uphold a certain price.

"Did you always uphold the price?"

"Yes."

Mr. King went on to say that sometimes he would find it advisable to quote another price. He would not change to the new price, however, until he had called a meeting and acquainted the other members with his intentions.

"I would say," said Mr. King, "that the object of these meetings was to bring about stability of prices."

The witness stated that the disbanding of the association in 1904 was the result of a notification to the effect that the meetings were illegal. The members of the associations, however, were informed that they had a constitutional right to meet and discuss conditions, announce prices they were charging, etc. Mr. King, however, was not sure whether they were given the right to announce prices they would charge in the future. There is no question, he admitted, that prices were announced and then upheld by the manufacturers in most cases. The purpose of those who attended the meetings, said Mr. King, was primarily to create stability in the market. The intention was not to secure as high a price as possible and Mr. King related how, in 1906 and 1907, the manufacturers agreed to keep the price down, thus avoiding a runaway market.

The First Gary Dinner

Mr. King was asked about the first "Gary dinner" in 1907. At this meeting, the witness said, the manufacturers were encouraged not to allow the panic to excite them. They were also advised to keep up prices and not give their business away at ruinous prices. For the purpose of organizing the manufacturers, in order that the situation might be kept in hand, an advisory committee was formed, consisting of Judge Gary, W. E. Corey, Powell Stackhouse, E. C. Felton, W. L. King and, later, C. M. Schwab and Edward Bailey. Sub-committees were appointed in turn. The members of the steel bar committee, to the best of Mr. King's recollection, included John A. Topping, W. G. Parke, Powell Stackhouse and some others. Mr. King was chairman of this committee. Other sub-committees of which Mr. King was a member were the structural materials and billet and sheet bar committees. Mr. King said he could not exactly recall who were the other members of these committees, but he said that he had a complete list of these at his office. This list he had secured from THE IRON TRADE REVIEW.

"Did you attend a luncheon in New York on Feb. 18, 1909?"

"Yes." Mr. King said that Judge Gary was the moving spirit of this luncheon.

"Did Judge Gary say anything as to any action that would or should be taken in the future?"

Judge Gary's Announcement

"Yes, he said that conditions were then such that the United States Steel Corporation might in the future act independently as to price. In other words, the effect of the panic had disappeared and natural laws might again be resumed."

"You don't mean that Judge Gary said that?" interjected Mr. Severance.

"No, that was only my own impression."

In cross-examination, Mr. Severance read the portion of the government's petition in which it was explained that meetings of the manufacturers merely to discuss trade conditions would not be classed among the actions in restraint of trade. Mr. King was asked if anything done at the meetings was of such a nature as to be classed as illegal by the terms of the government petition. He replied that nothing, which was not covered in that portion of the petition which had been read, was done.

Mr. Severance questioned Mr. King as to his business experience, and the latter replied that he had commenced with the Jones & Laughlin Steel Co. when he was 18 years of age and had continued with that company ever since, rising through the various offices up to that of vice president. For more than 30 years he had been connected with the sales department.

"Isn't it a fact," asked Mr. Severance, "that pools of various kinds have been in existence in the steel industry since as far back as you have any recollection?"

"It is," replied Mr. King.

"Do you remember any other time in your career when during a period of eight years, with the exception of the years 1904-12, there were no pools in operation?"

"I do not."

"Do you know of any pools which have been in operation since the various pools were disbanded, as you yourself have said, at the order of Judge Gary?"

"I do not."

Mr. King was then questioned further in connection with the so-called "Gary dinners," especially with reference to what Judge Gary said as to price agreements, the purpose of the dinners, etc. Judge Gary, said the witness, repeatedly expressed his unalterable determination not to enter into any price agreements, on the

ground that such agreements were contrary to the law.

Independents Prosper

In further cross-examination, Mr. King said that the independent steel companies have generally prospered greatly since 1901, thereby showing that competition with the United States Steel Corporation has not harmed these interests. From 500,000 tons in 1901 the output of the Jones & Laughlin Steel Co. has been increased to about 1,500,000 tons annually.

"Do you coincide with the opinion, expressed by some other witnesses in these hearings, that the Steel Corporation could put all its competitors out of business, if it desired to do so?" asked Mr. Severance.

"I never was very much afraid of that," said Mr. King with a smile.

"Then you don't believe there is much danger?"

"Not much." Mr. King said it would not be good policy for the Steel Corporation to make such an attempt.

In redirect examination, Judge Dickinson wanted to know if the witness thought the Steel Corporation would not put its competitors out of business or if it had not the power to do so. The witness answered that all the larger companies, because of more reserve power, could undoubtedly put their smaller competitors out of business.

"They could not put them out of business permanently, however. It is my experience that a company never dies."

"If Judge Gary told you that the Steel Corporation had the power to put its competitors out of business would you believe him?"

This question raised a storm of objections from the opposing counsel. The witness, however, finally replied:

"If Judge Gary made such a statement I would give it very careful consideration — and form my own opinion."

Relied on Each Other

Judge Dickinson tried again and again to get the witness to admit that the meetings of the various manufacturers from 1904 to 1907 resulted in price agreements. Mr. King said that the purpose of the meetings was to create stability in the market price, that is to keep it from running away, either up or down. Mr. King stated that the manufacturers left these meetings with the mutual feeling that they might rely on each other to maintain the price. He would not admit any out-and-out price agreements, however.

Judge Dickinson also endeavored to determine from Mr. King whether or not Judge Gary's action in taking the initiative in disbanding the pools did not have its inception in a warning of a coming governmental investigation. This Mr. King did not know. He said that the first he heard of any prospective investigation was about a year or more after the pools were disbanded.

Mr. King produced a copy of a book on the "Gary dinner," of Oct. 15, 1909, published by THE IRON TRADE REVIEW, and this was entered in the record. It contained the speeches and other proceedings at this dinner.

Mr. Donner Called

W. H. Donner, now president of the Cambria Steel Co., was questioned in regard to the sale of the National Tin Plate Co., which he organized, to the American Tin Plate Co. This company had plants at Anderson, Ind., and Monessen, Pa. Mr. Donner also organized the Union Steel Co., Donora, Pa., in which he had a one-fourth interest, the other three-fourths being owned by A. W. Mellen. Subsequently Mr. Mellen sold one-third of his holdings to H. C. Frick. Mr. Donner went into considerable detail regarding the equipment of the Union Steel Co. at the time it went into the hands of the United States Steel Corporation. At that time, the company had under construction at Donora two blast furnaces, 12 open-hearth furnaces, one mixing furnace and one blooming mill. The sale to the Steel Corporation was made only about a month after the merger of the Sharon and Union Steel companies. The sale was first suggested by Mr. Frick, who, being interested in both the Steel Corporation and the Union company, could thus take an active interest in neither.

The hearing was adjourned at this point, Mr. Donner being requested to appear on Tuesday. His further testimony is published on another page of this issue.

Furnaces Relighted

The Carnegie Steel Co. is blowing in two additional furnaces, one Edgar Thomson at Bessemer, Pa., on Bessemer, and one at Farrell, Pa., on basic. This brings the blast furnace operations of the Steel Corporation at present to about 90 per cent of capacity. The Steel Corporation has several other furnaces in shape ready to resume.

ORE SHIPMENTS

Exceed 7,000,000 Tons During September.—Tax Question Settled.

Ore shipments during September were 7,287,230 tons, an increase of 2,056,161 tons over the movement for September, 1911, and only 473,018 tons less than were moved during August. The movement to Oct. 1, is 36,338,382 tons, an increase of 11,501,245 tons over the corresponding period during 1911. Following were the shipments by ports:

Port:	Sept., 1911.	Sept., 1912.
Escanaba	668,595	770,974
Marquette	367,964	566,178
Ashland	368 945	757,764
Superior	1,563,836	2,031,086
Duluth	1,131,247	1,652,735
Two Harbors	1,130,482	1,508,493
Total	5,231,069	7,287,230
1912 increase		2,056,161

Port.	To Oct. 1, 1911.	To Oct. 1, 1912.
Escanaba	3,086,847	4,010,985
Marquette	1,568,711	2,567,578
Ashland	1,878,786	3,623,161
Superior	7,946,109	11,097,276
Duluth	5,501,364	7,729,187
Two Harbors	4,855,320	7,310,195
Total	24,837,137	36,338,382
1912 increase		11,501,245

Of the shipments during September, 5,536,291 tons came to Lake Erie ports, distributed as follows:

Port.	September, 1912.
Buffalo	748,672
Erie	72,463
Conneaut	1,030,911
Ashtabula	1,281.361
Fairport	287,083
Cleveland	1,184,249
Lorain	527,834
Huron	46,238
Sandusky	.....
Toledo	301.770
Detroit	55,710
	5,536,291

The ore handling companies and the tax officials have finally reached an agreement as to the proper basis for taxing ore on Lake Erie docks. The ore companies were willing to pay a tax of 40 cents upon the total burden remaining on the docks in April, which for the year 1912 was 6,000,000 tons. This would work out at a total valuation of $2,400,000, but there was considerable criticism of the arrangement as the tax officials are pledged to return property at full valuation. It was, therefore, decided to tax one-sixth of the ore, or 1,000,000 tons, at $2.40, the remainder being regarded as in transit. The ore companies also agreed to pay taxes on a valuation of $2.40 on 1,000,000 tons remaining on dock in April, 1911.

The Waterloo, Cedar Falls & Northern Railway Co., Waterloo, Ia., has ordered from the Westinghouse Electric & Mfg. Co. two quadruple equipments of motors.

MEN OF THE IRON TRADE

Thomas Towne has been appointed general manager of sales of the Union Drawn Steel Co., Beaver Falls, Pa. His headquarters will be at Beaver Falls. Mr. Towne is 45 years of age, having been born July 2, 1867. He entered the works of the Orange county furnace at Middletown, Orange county, New York, in 1882. Five years later, he became connected with the Garvin Machine Co., New York. He was made eastern sales agent of the Union Drawn Steel Co., on Nov. 1, 1891, and held this position for 21 years until his recent appointment as general manager of sales. He is said to have had a longer tenure of office as American mill representative than any other sales manager at present in New York. Mr. Towne has been connected with engineering in the iron and steel business for 30 years. He is a member of the American Society of Mechanical Engineers; the International Society for Testing Materials; the American Society for Testing Materials; and of the iron and steel division of the standards committee of the American Society of Automobile Engineers.

P. C. Knegle has returned to his home in Columbiana, O., after three years' employment with the Tata Iron & Steel Co., Sakchi, India.

Norman Leeds, general manager of the Automatic Machine Co., Bridgeport, Conn., has returned from a three months' trip to Europe.

Rodman Wister, iron and steel, No. 672 Bullitt building, Philadelphia, who has been traveling in Europe, will sail for this country this month.

William S. Ranson, of Matthew, Addy & Co., pig iron and coke brokers, of Cincinnati, has gone to the Bermuda Islands on an extended vacation.

E. G. Buckwell, secretary and manager of sales of the Cleveland Twist Drill Co., Cleveland, sailed on Oct. 5 for a two months' business trip abroad.

Joseph Beck, superintendent of the sheet department of the Youngstown Sheet & Tube Co., has resumed his duties after an outing of six weeks at Saranac Lake, N. Y.

Henry A. Butler, who has been assistant general superintendent at the works of the Youngstown Sheet & Tube Co., has been made manager of the order department, a position just created.

Frank S. Witherbee, president of Witherbee, Sherman & Co., Inc., Port Henry, N. Y., has resigned as a director of the Chatham & Phenix National Bank of New York, and the Citizens' Central National Bank of Port Henry, N. Y., in order to qualily as a Republican presidential elector.

George S. Whyte, president of the Macomber & Whyte Rope Co., Chicago, has moved to Kenosha, Wis., where he will have direct charge of the new wire and wire rope mill recently built by his company. The old plant at Coal City has been disposed

THOMAS TOWNE,
General Manager of Sales of the Union Drawn Steel Co.

of to Sears, Roebuck & Co., of Chicago, who will occupy same after Nov. 1. The main offices of the Macomber & Whyte Rope Co. will remain at 507-509 South Clinton street, Chicago, sa heretofore.

W. H. Nichols, president of the Nichols Copper Co., has been elected president of the Granby Consolidated Mining, Smelting & Power Co., as successor to George M. Luther, who is retiring because of ill-health.

Thomas Ware, who for the past six years has been secretary and treasurer of the Belle City Malleable Iron Co., Racine, Wis., tendered his resignation last week and after Nov. 1 will be connected with the Hartmann Trunk Co. At a meeting of the directors of the Malleable Iron company, held last Friday, Mr. Ware was re-elected secretary and treasurer. What position he will occupy with the Hartmann Trunk Co. is not known and will not be until the return of Henry Hartmann from London, Eng., about Nov. 1.

Horace E. Andrews was elected a director of the Westinghouse Air Brake Co., Pittsburgh, at the recent annual meeting of the stockholders. He succeeds H. E. Smith. The other retiring directors were re-elected. President George Westinghouse was re-elected. The stockholders also voted in favor of the proposed addition of 5,000 shares of the unissued capital stock to the employes' pension fund.

Bertram D. Robinson, who for many years has been identified with the pig iron industry and for the past five years has represented B. Nichol & Co., New York City, in the eastern states, has been employed by Whitehead Brothers Co. and will represent them on the road through New England, taking the position of the late George S. Bullock, who traveled for the Whitehead company in this territory for over 35 years. Mr. Robinson, who is widely known in the trade, will be prepared to offer a general line of foundry sands and supplies through his connection with the Whitehead company.

Edwin F. Leigh, of Chicago, who recently moved to Marion, O., has assumed the position of general manager of the plant of the Marion Malleable Iron Co., succeeding John C. Haswell in that position. Mr. Haswell, who has managed the affairs of the company for the past 14 years, has resigned his position as general manager to devote more time to other interests, but will remain in Marion and retain his interest in the malleable iron business, also his office as vice president of the company and a member of the board of directors. Mr. Leigh, the new manager, has heretofore been connected with the sales department of the Chicago Railway Equipment Co., of Chicago.

CONGRESS OF HYGIENE

Noteworthy Exhibit of the American Iron and Steel Institute.

One of the most important exhibitions ever held in this country closed last Friday in Washington after being open for three weeks. It was the exhibition held in connection with the Fifteenth International Congress on Hygiene and Demography. This congress, the first ever held in America, was held on the invitation of the national government and was participated in by more than a score of foreign countries and more than two score of our states. Its object was the promotion of human health.

The exhibition was held in a building especially erected for the purpose, located on the Mall, diagonally across from the building of the Pan American Union. Here all sorts of appliances for promoting health and safety were shown. The exhibits were arranged in 13 groups, so as to make investigation easy and effective. In the group showing military, naval and tropical hygiene, the chief exhibitor was the United States government. Several states and cities made exhibits of state and municipal hygiene.

In the group showing industrial and occupational hygiene, the most noteworthy exhibit was that of the American Iron and Steel Institute, one of whose purposes is "to promote health and safety in mine and mill". This exhibit was so large that supplementary space had to be secured. It was under the care of courteous attendants who gladly gave information to large numbers of intelligent inquirers. The exhibit was a revelation to those who have not been keeping track of what is being done by the iron and steel producers of this country for the welfare of their employes.

As might be expected, the Institute's principal exhibit was furnished by the United States Steel Corporation and its subsidiaries. Everywhere appeared evidence of careful thought. On the walls were exhibited warning signals indicating danger and the need of caution. These were in many languages, to meet the needs of the men of many lands employed in the industry. Among the subsidiaries of the Corporation making exhibits of models and photographs covering all sorts of appliances for the prevention of accidents, the care of the injured, for providing water supply and toilet conveniences; pictures showing housing conditions and gardens, playgrounds for the children, and many other things calculated to promote health and happiness among the men and their families, were the Carnegie Steel Co., the National Tube Co., the Henry C. Frick Coke Co., the American Bridge Co., the Oliver Mining Co. and the Tennessee Coal, Iron & Railway Co.

The principal exhibitors among the independent companies were the Lackawanna Steel Co., photographs showing safety devices used in the mills and social service in the homes of the men; the Pennsylvania Steel Co., photographs showing provisions for safety in its mills; the Maryland Steel Co., photographs showing its herd of 100 Jersey cows used to standardize the quality and price of milk, and photographs showing its prize gardens; the Jones & Laughlin Steel Co.; photographs showing the model housing conditions at its Aliquippa works; the Bethlehem Steel Co., photographs showing model yard conditions about its mills; the Cleveland-Cliffs Iron Co., photographs showing housing and social service at its mines; the American Blower Co., working model of its mine ventilator; Norton Co., models of its grinding wheels with their safety operating stands; the Thomas Iron Co., photographs showing its housing conditions; the Empire Steel Co., working model of its safety mine hoist and photographs of working conditions at its plants; the American Steel Foundries, safety appliances and photographs showing working conditions at its plants.

Many of these exhibits are being donated to the permanent Museum of Health and Safety Appliances at the headquarters of the American Iron and Steel Institute.

INDUSTRIAL SAFETY

Council Formed by Iron and Steel Electrical Engineers.

Milwaukee, Oct. 8.—The safety congress of the Association of Iron and Steel Electrical Engineers, which was in session at Milwaukee during last week, resolved itself into a national organization to be known as the National Council for Industrial Safety. Plans for an organized national campaign for the promotion of industrial safety were adopted and preliminary arrangements for the next safety congress in 1913 were outlined.

The report of a committee representing each of the organizations which participated in the Milwaukee congress contained the following recommendations:

"That a national organization along lines similar to existing organizations, which make the subject of safety a part of their program, is expedient, and that there is need and opportunity for a co-ordinating body which shall serve for future congresses and safety exhibits the same function which the Association of Iron and Steel Electrical Engineers served in making this congress possible."

The committee was at once made permanent as the National Council for Industrial Safety and will add to its number representatives of other bodies which concern themselves with safety problems. Officers were chosen as follows: Chairman, Fred C. Schwendtman, National Association of Manufacturers; vice chairman, Lew R. Palmer, Association of Iron and Steel Electrical Engineers; secretary, Dr. Lucian W. Chaney, department of commerce and labor.

For 1915 the National Council for Industrial Safety plans an international safety congress in conjunction with the Panama-Pacific exposition at San Francisco.

C. W. Parkhurst, Johnstown, Pa., was elected president of the Association of Iron and Steel Electrical Engineers at the annual convention. E. Friedlander, Braddock, Pa., was elected first vice president; O. R. Jones, Youngstown, O., second vice president, and James Farrington, Steubenville, secretary and treasurer. Gano Dunn was elected an honorary member, and presided at the banquet on Monday evening, the addresses at which were along the lines of industrial safety and sanitation. Dr. Joseph A. Holmes, director of the bureau of mines, spoke on "Safety and Industrial Efficiency." R. W. Campbell responded to the toast, "Safety in the Iron and Steel Industry." The topic of Lucien W. Chaney was "Industrial Betterment at Home and Abroad." B. R. Shover, retiring president, made an address on "The Iron and Steel Electrical Engineer."

At the first business session, Secretary Farrington reported an increase in the membership since last year of 137. The association since the last convention has been incorporated under the laws of Pennsylvania on the date of June 29, 1912. Several addresses were made at the business session, A. E. Handy, of the Otis Elevator Co., speaking on "Blast Furnace Tops;" E. D. Dickinson, of the General Electric Co., on "Special Reference to the Use of the Steam Regenerator," and Wilfred Sykes, of the Westinghouse Electric & Mfg. Co., on "Power Problems in Steel Mills."

NEW MEMBERS

Elected by American Iron and Steel Institute.

At the regular monthly meeting of the directors of the American Iron and Steel Institute at New York, Oct. 4, 121 applications for membership were favorably acted upon and added to the roll of the organization. This brings the total membership of the institute to 725. Apart from this action, the meeting was taken up with routine matter. The next regular meeting of the directors will be held at Pittsburgh in connection with the fall meeting of the institute, Oct. 25 and 26. A complete list of the new members elected is as follows:

William H. Abbott, Wheeling, W. Va., assistant secretary, Wheeling Corrugating Co.

W. E. Acomb, Donora, Pa., superintendent, Donora Wire Works, American Steel & Wire Co.

George Baker, Chicago, general manager sales, Illinois Steel Co.

John C. Bannister, Kewanee, Ill., manager Kewanee Works, National Tube Co.

Thomas A. Beattie, Wheeling, W. Va., manager Riverside Works, National Tube Co.

Leonard T. Beecher, Birmingham, Ala., secretary and treasurer, Tennessee Coal, Iron & Railroad Co.

P. D. Block, Chicago, vice president, Inland Steel Co.

Charles M. Booth, Worcester, Mass., sales agent, American Steel & Wire Co.

Roswell M. Boutwell, Boston, treasurer, Standard Horseshoe Co.

Arthur J. Boynton, Lorain, O., superintendent blast furnace, National Tube Co.

Hermann A. Brassert, South Chicago, superintendent, blast furnace, Illinois Steel Co.

Richard T. Brown, Ellwood City, Pa., superintendent Standard Works, Shelby Steel Tube Co.

John Brunner, Chicago, acting inspecting engineer, Illinois Steel Co.

Samuel P. Bush, Columbus, O., president and general manager, Buckeye Steel Casting Co.

Perry E. Carhart, Chicago, inspecting engineer, Illinois Steel Co.

Garrett Cochran, Williamsport, Pa., wire rope manufacturer.

T. B. Coles, New York, sales agent, American Steel & Wire Co.

Howard D. Cook, Lorain, O., superintendent, skelp rolling mills, the National Tube Co.

Wm. A. Cornelius, McKeesport, Pa., manager, National Works, National Tube Co.

Geo. A. Cragin, Worcester, Mass., assistant general sales agent, American Steel & Wire Co.

Joseph G. Deericks, New York, sales agent, American Steel & Wire Co.

Louis A. Dietrich, New York, sales agent, American Steel & Wire Co.

J. Jay Dunn, Ellwood City, Pa., general superintendent, Shelby Steel Tube Co.

Samuel Dunlap, Cleveland, assistant auditor, American Steel & Wire Co.

Charles Fell, Lorain, O., superintendent pipe and tube mills, Lorain Works, National Tube Co.

William A. Field, South Chicago, general superintendent, South Works, Illinois Steel Co.

W. H. Foege, Chicago, sales manager, American Steel & Wire Co.

Joseph N. Gamble, Kewanee, Ill., superintendent Kewanee works, National Tube Co.

Albert H. Garry, Cleveland, assistant auditor, American Steel & Wire Co.

H. R. Gilbert, Pittsburgh, manager, Continental works, National Tube Co.

Andrew Glass, Portsmouth, O., general manager, Portsmouth Steel Co., of Portsmouth, O.

John W. Gocher, Johnstown, Pa., chief engineer, Cambria Steel Co.

Howard C. Griswold, Chicago, assistant inspecting engineer, Illinois Steel Co.

Benj. P. Hazeltine, Wheeling, W. Va., superintendent, steel work and skelp mill, National Tube Co.

F. Heberlein, Cleveland, superintendent, Consolidated works, American Steel & Wire Co.

Albert W. Hitz, Cleveland, superintendent, Newburg wire mill, American Steel & Wire Co.

John A. Hock, Pittsburgh, superintendent, Continental works, National Tube Co.

Alex. L. Hoerr, McKeesport, Pa., steam and hydraulic engineer, National Tube Co.

David C. Howard, Buffalo, president, Delaney Forge & Iron Co.

Ernest S. Humphrys, Chicago, department manager, sales department, American Steel & Wire Co.

James D. Ireland, Duluth, general manager ore department, M. A. Hanna & Co.

Lewis Johnson, Chicago, department manager, sales department, American Steel & Wire Co.

John E. Kemp, Kewanee, Ill., civil engineer, National Tube Co.

Wm. W. Kennedy, Wheeling, W. Va., superintendent, tube and pipe mills, National Tube Co.

Edward T. Kenney, Johnstown, Pa., metallurgical engineer, Cambria Steel Co.

Frederick A. Keyes, New York, sales agent, American Steel & Wire Co.

Austin King, Scottdale, Pa., chief mine inspector, H. C. Frick Coke Co.

John W. Kiser, Chicago, president, Phoenix Horseshoe Co.

C. S. Knight Jr., Chicago, department sales manager, American Steel & Wire Co.

Jos. W. Latshaw, Pittsburgh, manager Pennsylvania works, National Tube Co.

Alexander Laughlin, Pittsburgh, president, Central Tube Co.

John W. Lees, Indiana Harbor, Ind., general superintendent, Inland Steel Co.

Frank J. Llewellyn, Chicago, division central manager, American Bridge Co. of New York.

Paul P. Llewellyn, Chicago, care of Interstate Iron & Steel Co.

F. Lorenz, Cleveland, superintendent, H. P. works, American Steel & Wire Co.

Henry B. Lynch, McKeesport, Pa., superintendent of galvanizing plant, National Tube Co.

Anson Mark, Chicago, pipe manufacturer.

Chas. D. Marshall, Pittsburgh, president, McClintic-Marshall Construction Co.

Chas. B. McElhany, Johnstown, Pa., manager wire sales, Cambria Steel Co.

Robert J. Mercur, Montreal, Can., vice president, Standard Iron Co., Ltd.

Oliver M. Mowat, McKeesport, Pa., superintendent, coupling department, National Tube Co.

John A. McCulloch, McKeesport, Pa., engineer, galvanizing works, National Tube Co.

Duncan C. Macdonald, Worcester, Mass., district purchasing agent, American Steel & Wire Co.

Edward M. McIlvain, New York, president Lehigh Coke Co.

Peter A. Newton, South Chicago, assistant general superintendent, South Chicago works, Illinois Steel Co.

Chas. F. Nieman, Pittsburgh, president and treasurer, the Parkesburg Iron & Steel Co.

Harry O'Conner, DeKalb, Ill., superintendent North and South works, American Steel & Wire Co.

John O'Keefe, Sharon, Pa., superintendent American Steel & Wire Co.

Chas. G. Osborne, South Chicago, metallurgical engineer, Illinois Steel Co.

John W. Offutt, Ellwood City, Pa., superintendent, Shelby Steel Tube Co.

Albert Patten, McKeesport, Pa., superintendent Steel Works department, National Tube Co.

Ralph H. Pratt, New York, sales agent, American Steel & Wire Co.

Chas. H. Putnam, Cleveland, superintendent, American works, American Steel & Wire Co.

Oscar L. Pringle, McKeesport, Pa., assistant to superintendent, blast furnaces, National Tube Co.

Max Rosenkranz, Pittsburgh, mechanical engineer, Continental works, National Tube Co.

Thomas W. Simpers, Philadelphia, manager sales, American Sheet & Tin Plate Co.

Orville C. Skinner, Burnham, Pa., assistant superintendent, Standard Steel Works Co.

Malcolm R. Stevenson, McKeesport, Pa., superintendent blast furnace department, National Tube Co.

Bradley Stoughton, New York, consulting metallurgical engineer.

Max Suppes, Lorain, O., manager, Lorain works, National Tube Co.

William W. Taylor, Lynchburg, Va., vice president and general manager, Oriskany Ore & Iron Corporation.

George Timmins, Syracuse, N. Y., manager National Tube Co., Syracuse works.

Wm. J. Totten, Chicago, assistant general manager sales, Illinois Steel Co.

Lawrence H. Underwood, Wheeling, W. Va., superintendent blast furnaces, Riverside works, National Tube Co.

Fred W. Waterman, Lorain, O., mechanical engineer, Lorain works, the National Tube Co.

A. T. Weaver, Chicago, department sales manager, American Steel & Wire Co.

J. Wheeldon, Cleveland, superintendent Cuyahoga works, American Steel & Wire Co.

Albert C. Whitaker, Wheeling, W. Va., president, Wheeling Corrugating Co.

H. S. White, Braddock, Pa., superintendent, American Steel & Wire Co.

Silas H. Witherbee, Port Henry, N. Y., iron mining.

James H. Wilson, McKeesport, Pa., superintendent, National works, National Tube Co.

Idris R. Williams, Lorain, O., superintendent steel department and blooming mills, the National Tube Co.

Edward H. Williams, Hokendauqua, Pa., superintendent blast furnaces, Thomas Iron Co.

Harry S. Braman, Poland, O., superintendent, blast furnace and steel department, Youngstown Sheet & Tube Co.

Henry A. Butler, Youngstown, O., assistanct general superintendent, Youngstown Sheet & Tube Co.

James M. Camp, Pittsburgh, chief, bureau of instruction, Carnegie Steel Co.

Stewart C. Coey, Youngstown, O., assistant master mechanic, Youngstown Sheet & Tube Co.

Charles H. Elliott, Youngstown, O., assistant superintendent, blast furnaces, Youngstown Sheet & Tube Co.

Jacob M. Faris, Youngstown, O., master mechanic, Youngstown Sheet & Tube Co.

John W. H. Hamilton, New York, consulting engineer, Hamilton & Hansell.

Nils V. Hansell, New York, consulting engineer, Hamilton and Hansell.

Elmer T. McCleary, Youngstown, O., assistant superintendent, blast furnaces, Youngstown Sheet & Tube Co.

David R. Mathias, Joliet, Ill., general superintendent, Joliet works, Illinois Steel Co.

Wm. M. Mehlhorn, Pottsville, Pa., general superintendent, Eastern Steel Co.

Wm. M. Neckerman, Youngstown, O., superintendent, tube department, Youngstown Sheet & Tube Co.

Wm. C. Reilly, Youngstown, O., general superintendent, Youngstown Sheet & Tube Co.

David A. Russell, Youngstown, O., chief chemist, Youngstown Sheet & Tube Co.

Jos. R. Skewis Jr., McKeesport, Pa., master mechanic, National Tube Co.

Robert C. Kirk, Steubenville, O., treasurer, La Belle Iron Works.

Frank H. Nullmeyer, Youngstown, O., superintendent, rod and wire department, the Youngstown Sheet & Tube Co.

Harry D. Westfall, Steubenville, O., secretary, La Belle Iron Works.

Wm. H. Wright, Duluth, superintendent, coke department, Zenith Furnace Co.

M. Jackson Crispin, New York City, general manager, United States Metal & Manufacturing Co.

Samuel Deutsch, Chicago, iron and steel merchant.

Frederick D. Dimmick, Cleveland, J. K. Dimmick & Co.

F. Justice Grugan, Philadelphia, mining engineer.

Axel H. Helander, Youngstown, O., sales manager and consulting engineer, Wm. Tod Co.

John I. Matthews, Syracuse, N. Y., manager Halcomb Steel Co.

Elmer M. Schumo, Philadelphia, metallurgist, Wm. Wharton Jr.

Harrison Souder, Cornwall, Pa., general superintendent, Cornwall Ore Bank Co.

Thomas Woods, Pittsburgh, assistant general agent, Carnegie Steel Co.

SPECIAL INVESTIGATION

Of Labor Conditions Suggested by Brier Hill Steel Co.

The Brier Hill Steel Co., Youngstown, O., has recently written a letter to the Bureau of Labor, at Washington, suggesting that the present shortage of labor in the United States is of sufficient importance to merit a special investigation by the government. "There is," says the letter, "a decided slump in foreign labor throughout the steel industry. All mills are running short. In the Youngstown district alone, we could state unofficially, there is a deficiency of at least 1,000 men. The writer has written to several of the foreign consulates asking them whether or not they can give any special explanation for this undesirable state. The consulate in Hungary says that some steps have been taken by the home government to curtail emigration for economic reasons in that country which are very similar to the conditions we have now. The consulate in Italy has advised that three months of quarantine, together with a calling out of army reserves, has caused a disturbance in the emigration flow from Italy."

BRITISH IRON TRADE

Prospective Buying by America Causes Flurry.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Sept. 28.

Pig Iron.—There has been a little check in the upward movement this week, the sole explanation of which seems to be a certain amount of profit-taking on the Cleveland market. Speculators in warrants have done very good business, and are inclined to gather in their returns. So much iron coming on to the market at once brought a little reaction, but the effect of this is already passing away. Yesterday's price was 67s 4d ($16.48) for cash transactions, with 67s 8d ($16.56) for one month. There are signs now that the reaction has already spent itself. A fairly substantial inquiry from America caused a little flutter in the Cleveland market. People are already speculating as to the effect on prices, if America once more becomes a buyer. There have been fairly large transactions this week, but buyers are seizing every opportunity of "bearing" the market, although without much prospect of successful result. The great advances in pig iron are very much disturbing the foundry business, especially as many founders, particularly in the domestic department, could do with more work. The amount in store at Glasgow is 277,000 tons. The scarcity of vessels alone prevents very large reductions in the Cleveland stocks of material. Smelters generally expect decided advances in October, and they are not at all disturbed by the check in the buying movement, as under present circumstances, no such combination has the slightest chance of success. In the hematite department, the demand is unusually large. Prices continue very strong at 80s for east coast mixed numbers. The total shipments of pig iron for the month of September, so far, have been about 80,000 tons. The great scarcity of coke continues to operate as a buoyant element in the market.

Finished Iron and Steel.—The upward movement steadily progresses in regard to finished iron and steel. In the heavy steel department, Sheffield has established a new record this month, and the scarcity of billets is being severely felt. A number of the rolling mills are quite unable to give delivery for several weeks. There has been a slight advance in English billets, many makers asking £6 5s, while basic billets are quoted at £6 15s to £7. The rolling-stock makers at Sheffield are busier than ever, and are assured of sufficient work throughout next year. A great deal of new work has been placed by the government departments. Several of the local steel firms have held annual meetings this week, and in every case they report great activity and very cheerful prospects. In particular, the American market for high-class steel has improved, and a great deal more of such steel is going to the continent. Practically, all the steel-using industries are as busy as they can be. In the iron trade, it is quite the usual thing to be booked to the end of the year. It is known that the merchants are keeping back their orders till the last moment, in the hope that some little relaxation of pressure will enable them to obtain iron deliveries, for the renewal of their stocks. The makers of channels, girders, angles, tees, etc., are all very heavily booked. At the Birmingham meeting on Thursday, the chief feature was a further rise in the price of galvanized sheets, which are now selling at £12 15s. Some makers are standing out for £13 f. o. b. Liverpool. Still higher prices are likely, because of the increasing price of spelter. The black-sheet mills are working regularly. The only change in the price of finished steel is in steel strip, which has become rather dearer. In the north of England, an advance of 5s has taken palce, making common bars £8 10s. No formal declaration has been made in south Staffordshire, but advances are looked for, both in strip and common bars, between now and Quarter Day, a fortnight hence. There is increasing demand for foreign material, but all reports from the continent tend to show that neither Germany nor Belgium will have any considerable weight of iron to spare for some time to come. British users would be very glad to put their hands upon large quantities of wire rods, billets, etc., if such metal were available.

In the tin plate trade, there is great activity, with prices slowly but continuously advancing. In the Sheffield district, the only complaint is in regard to labor troubles. Some thousands of engineers' laborers are applying for an advance at several of the largest works, and the general belief is that concessions will have to be made. There are any number of openings for men and, as a rule, a workman who for any reason gets out of employment, has only to walk into the nearest factory, and he is received with a welcome.

LATEST MACHINERY NEWS COLLECTED IN LEADING MANUFACTURING CENTERS

In New York, while the past week did not bring out conspicuous buying, or important new inquiries by single interests, the aggregate machinery business was generally satisfactory to dealers. October gives every promise of even exceeding the large total of orders placed in September for shop and factory equipment. Some dealers are running short on certain lines of stock, but as a rule delivery is normal. Manufacturing plants throughout the New York territory are running at, or near, capacity, and most of the recent business has come from that source. Several important lists are reported to be under advisement by eastern railroads, however, and it is probable that during the next few weeks one or more of these will be distributed. The Boston & Maine and the Baltimore & Ohio are the most prominent among those mentioned as probably early buyers. Definite action on the New York, New Haven & Hartford list is looked for any day by dealers who have bids in for the business. This announcement will likely be followed by the placing of orders by the Morgan's Louisiana & Texas Railroad & Steamship Co. on the large list of specifications put out Sept. 19. These will make the largest aggregate of railroad business done in this market for many months.

In Pittsburgh, machine tool dealers report a fair demand for single tools, but no large inquiries are announced. Builders of foundry and rolling mill machinery have benefited from recent extensions to plants in this district, and there has been considerable repair work. Competition has been so keen, however, builders report difficulty in obtaining entirely satisfactory prices.

In Cleveland, representatives of many outside plants are receiving schedules of the earliest delivery dates possible on various lines of machine tools. In some special designs, delivery can not be guaranteed till June or July of next year, but this is exceptional. In numerous cases, however, the first of the year is the date set for deliveries on orders taken at this time. Some dealers, while reporting their failure to secure prompt delivery on certain lines, state that they are not as yet seriously affected by the question of delivery. All lines of tools are going freely, orders are numerous, and business is generally satisfactory.

In Cincinnati, judging from the orders already taken, and from the number of inquiries in the market, the machine tool business will be as good during the month of October as it was in September. It is hardly probable, however, that it will reach the higher level maintained in August. Activity among the machine tool manufacturers seems to have returned to the condition that existed for some time after the first of the year—that of a number of the plants being extremely busy, and others unable to get as many orders as they should to enjoy a good business. Most manufacturers of electrical equipment are still running along at full capacity, and some are attempting to run night shifts, but are unable to get the labor to do so. Second hand machinery is gradually improving in demand, and this line is beginning to show signs of life after several years of dullness.

New Construction

The Vulcan Iron Works, New Britain, Conn., is to erect a one-story addition to its plant, 75 x 154 feet, estimated to cost $4,500.

The St. Louis Car Co., of St. Louis, Mo., has agreed to establish a branch factory at Moose Jaw, Sask., employing 100 men.

The Reading-Bayonne Steel Co., Reading, Pa., has awarded a contract for the erection of an addition and general repairs to its plant along the Lebanon Valley railroad.

The directors of La Belle Iron Works, Steubenville, O., have authorized improvements amounting to approximately $200,000, which will include an addition to the open-hearth plant.

The Lennox Throatless Shears Co., Marshalltown, Ia., which began operating in leased quarters Aug. 20, has found it necessary to expand, and with this purpose in view has purchased a site, 60 x 180 feet, which will be covered entirely by a one-story building of brick construction. It is said more machinery will be installed.

The Iron City Stove & Foundry Co., Bristol, Tenn., will erect its buildings in the immediate future. A foundry and a finishing department will be equipped. Lemuel George is general manager.

The Carroll Wire Fence Works, Carroll, Ia., has been bought by the Quinn Wire & Iron Co., Boone, Ia., and will be removed to Boone, where an extension will be added to the west wing to provide for the additional works.

The American Machine & Foundry Co. has purchased the block front of 100 x 700 feet on the north side of Fifty-sixth street, from First and Second avenues, South Brooklyn, N. Y., and will build a three-story structure on the plot.

The Bettendorf Axle Co., Bettendorf, Ia., which is erecting a new foundry, a duplicate of the one already located at the east of the main buildings, will probably begin the construction of another foundry when the present one is completed, according to reports.

The Thomdilee Co. is to erect a large weave shed at its West Warren, Mass., cotton mills. The structure will be of brick, steel and concrete construction, 400 x 80 feet, two and three stories, and will cost $120,000. The J. W. Bishop Co., Worcester, has the general contract.

The Fargo Foundry Co., headed by Henry B. Fargo, will be incorporated soon for the manufacture of sad irons at Geneva, Ill. A foundry, 50 x 200 feet, one story, brick, steel and concrete construction, will be erected at once. Another building of similar size will be built next spring.

The Walloff Motor Truck Co., of Minneapolis, has undertaken, in consideration of receiving a free site and free gas, to establish a plant at Red-

cliff, Alta., for the manufacture of motor trucks and automobiles. The main building will be 60 x 150 feet, and 50 men will be employed at the outset.

Machine Tools

The Yager Motor Car Co., Louisville, Ky., will build and equip a repair shop. The machine tools needed will be determined in a few weeks.

Joseph T. Ryerson & Sons, 30 Church street, New York, will furnish the following list of flue-shop machinery for installation in the Sommerville, Mass., shops of the Boston & Maine railroad: One overhead type flue cleaner; one flue welding machine; one machine for cutting tubes to length; one fag-end and expanding machine; one safe-end machine. All of the apparatus will be motor-driven.

Financial

The Universal Nut, Bolt & Lock Co., Newport, Ky., has increased its capital stock from $50,000 to $75,000.

Negotiations are in progress for a reorganization of the Atlas Motor Car Co., of Hartford, Conn., the plant of which is closed at present.

The Thompson Motor Car Co., Chicago, on Sept. 30 filed a voluntary petition of bankruptcy in the United States district court, with liabilities of more than $185,000. The principal creditor is the E. R. Thomas Motor Car Co., of Buffalo.

The plant of the Wilmington Iron Co., Wilmington, Del., is advertised to be sold on Oct. 24, by the Equitable Guarantee & Trust Co., as trustee. Two mortgages upon which the company is alleged to have failed to pay interest are held by the trust company as security for an issue of $150,000 bonds of the iron company.

New Buyers

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

American Iron & Tin Products Co., Cleveland; $100,000; Geo. W. Crossette, Robert S. Hamilton, C. A. Schlup, Roy Young, S. S. Kail.

The Steel Scaffolding Co., Evansville, Ind.; $50,000; to manufacture steel scaffolding; by J. R. Goodwin, W. C. and P. E. Goodwin.

H. & M. Screw Co., Fostoria, O.; capital, $10,000; by Kahlen S. Carr, N. R. Pillars, C. B. Howell, N. Hartsook, Genevieve Carr.

Hart Valve Agency, Worcester, Mass.; capital, $25,000; by Robert H. Disney, president and treasurer; Geo. W. Cowan and Gertrude A. Quinn.

The Marine Welding Co., Buffalo, $150,000; steel and iron finishers; by Edward N. Smith, Harry G. Smith, Edward Oldman, Lance Nicholson, 32 Lafayette avenue, Buffalo.

Metal Products Co., Boston; capital stock, $1,000; by incorporators Walter H. Billings, president; Louis E. Billings, treasurer, and Harold A. Huckins.

McDowell Shoe Machinery Co., Inc., Lynn, capital stock, $200,000; by incorporators, Warren Stetson, president; Albert L. Howes, treasurer, and Lloyd F. Roberts.

C. Kloepfer, Ltd., Guelph, Ont.; capital $250,000; to manufacture motor vehicles and hardware; provisional directors, Christian Kloepfer, Edward Halloran, George A. Scott and others.

Bulldog Tire Co., Ltd., Toronto, capital $300,000; to manufacture tires and automobiles; provisional directors, Wm. J. Tubman, Jennie H. A. Blair and Irene Rouse.

G. S. Blakeslee & Co., Ltd., Sarnia, Ont., capital $40,000, to manufacture dish-washing and other machinery; provisional directors, George S. Blakeslee, George R. Blakeslee, Norman St. C. Gurd, and others.

Forsyth Pulverizer, Ltd., Toronto, capital $250,000; to manufacture rock-crushing and mining machinery; provisional directors, Walter F. Gouinlock, James A. Byers, Cecil E. Davies and others.

Braddock & Burns Foundry & Machine Co., Wheeling, W. Va.; $50,000; foundries and machine shops; by Wm. J. Braddock, C. A. Burns, Mary V. Braddock, Margaret M. Burns, Jos. B. Burns, all of Wheeling.

The Standard Bolt & Forging Co., Columbus, O.; $100,000; to manufacture bolts, castings, etc.; by H. E. Vance, F. C. Schmidt, E. H. McCloud, J. A. Riley and J. C. Burns, all of Columbus.

Lyon Mfg. Co., Fitchburg, Mass., to manufacture cleaning bobbins and other textile machinery; capital stock, $50,000; by directors, Peter F. Ward, president; Alfred P. Cote, treasurer; A. J. Beauchemin.

Springfield Facing Co., to manufacture foundry faces, etc., capital stock, $40,000; by incorporators, Luman S. Brown, president; Philip H. Remington, treasurer, and Gordon W. Gordon.

Twentieth Century Steel Co., Camden, N. J.; $225,000; to manufacture steel and iron products; by Edw. H. Sterner, Wilbert P. Felix, Samuel Hassell, John E. Spotts, John A. Schultz, all of Williamsport, Pa.

A. B. C. Novelty & Mfg. Co., Jersey City; $25,000; to manufacture cast white metal novelties, small novelties, small hardware, etc.; by Wm. R. Armstrong, Jersey City; G. G. Gillan, New York.

John R. Price, Inc., Newark, N. J.; $100,000; to manufacture gasoline engines, machinery, etc.; by John R. Price, 398 Washington street; Geo. W. Knorr, 248 Littleton avenue, and Hannah E. Price, 326 Washington street, all of Newark.

Orswell Electric Co., Boston, to manufacture and deal in machinery, tools, etc.; capital stock, $50,000; by incorporators, Israel C. Orswell, president; Annie E. Orswell, Quincy, Mass., treasurer, and Joseph R. Fuller.

General Industrial

The Kentucky Auto Co., Louisville, Ky., Ira A. Barnett, manager, will establish a service department at Lexington, Ky., and install a repair shop.

The Concrete Steel Co., Youngstown, O., is planning on leasing property, 200 x 400 feet, as a site for its proposed new plant.

The Ideal Wheel Co., Cincinnati, is in the market there for a site for a plant or for the purchase of a building.

The Worcester Gas Light Co., Worcester, Mass., has awarded the Riter-Conley Mfg. Co., Pittsburgh, the contract for a gas holder with 4,000,000 cubic feet capacity. It will be 210 feet in diameter and 465 feet high, and will require 2,000 tons of structural steel.

A company which proposes to operate a mill for making specialties from steel rails is being formed at Newberry, Pa. The mill will be established just outside of New York City, it is said, and will employ at start 150 to 200 men. The company will be capitalized at $225,000. Among those interested in it are John Spotts, W. P. Felix and E. Sterner, all of Newberry.

The Greenfield Tap & Die Corporation, Greenfield, Mass., a holding company that controls the stock of the Wiley & Russell Mfg. Co. and Wells Bros. Co., on Oct. 1, acquired the entire stock of the A. J. Smart Mfg. Co., which was organized six years ago and established a name for the manufacture of the highest class of taps, dies and screw plates. The company will be continued as a separate organization and conditions are extremely favorable for the continuation of its very rapid growth. The new officers are: President, F. O. Wells; vice president, Rollin S. Bascom; treasurer and clerk, F. H. Payne;

directors, the above and Wm. M. Pratt and J. W. Stevens.

The Northwest Steel Co., Portland, Ore., has been granted a site in Vancouver, B. C., by the Great Northern railway, according to an interview credited to vice president L. C. Gilman of that line, and will erect a structural steel plant. W. B. Beebe, president of the steel company, will form a new corporation for the Canadian end of the business, which will be devoted to fabrication of structural steel imported from the United States.

The Impervious Sheet Steel Co., recently organized by well known Pittsburgh manufacturers, is building a new plant at Rochester, Pa., where black coated sheets, impervious to rust, will be made. The new works will be in operation the first of the year, and will have a capacity of about 25,000 tons. Seven acres of land have been purchased, and three buildings are being erected. The main building will be 275 x 85 feet, the pickling plant 48 x 48 feet, and a boiler house, 30 x 40 feet. Charles E. Pope, Pittsburgh, former head of the Pope Tin Plate Co., Steubenville, O., is at the head of the new company, and will actively direct its affairs.

The Standard Steel Construction Co., Ltd., organized by R. W. Knight, of Pittsburgh, and E. A. C. Kuhnel, of Carnegie, Pa., representing American capitalists, has decided to locate a plant at North Welland, Ont., where a site of several acres has been secured, for the fabrication of structural steel. The company will at once erect two buildings 300 x 500 feet and 80 x 500 feet, to serve as temporary headquarters in order to begin operating as soon as possible, and will afterwards install its permanent plant. The initial investment will be about $200,000. When the works are completed they will employ from 1,200 to 1,500 men, and will have a capacity of 4,000 tons of structural steel per month.

The organization of the Oxweld Railroad Service Co., incorporated by Henry W. Jacobs, president; Charles B. Moore, vice president and treasurer; G. H. Pearsall, vice president; M. C. Beymer, secretary, is a long step toward a permanent and intelligent introduction of oxy-acetylene welding as a means of reducing railroad maintenance and operation costs. Oxy-acetylene as a means of welding and cutting metals is not a novelty, but with a few exceptions, has heretofore been applied to emergency uses and considered an interesting rather than a useful adjunct to shop equipment. Properly applied, oxy-acetylene has wide utility and the Oxweld Service Co.'s experience in its development and installation on a broad scale will bring to the railroads many opportunities for the saving of both time and material.

The General Electric Co., through its Charlotte, N. C., branch, has been awarded a contract for the electrical equipment for the 40,000-horsepower hydro-electric power plant to be erected at Whitney, N. C., by the Southern Aluminum Co. The equipment ordered involves an expenditure of about $400,000 and includes seven 5,000-kilowatt and two 2,500-kilowatt, 250-volt, alternating current generators, with all necessary switchboard and control apparatus. The Southern Aluminum Co. was organized through the Banque Franco-Americaine, of Paris, and has a capital of $8,000,000. It owns 3,000 acres at Whitney and has commenced the construction of a plant to have an output of 10,000 tons of pure aluminum a year. The development will cost about $10,000,000, and the plant will be ready about next June. The dam has already been built and work is now being pushed on the power plant, the aluminum plant proper and 500 concrete cottages for the employes of the company.

The Taylor Iron & Steel Co., High Bridge, N. J., announces the acquisition of the Wm. Wharton Jr. & Co. Inc., Philadelphia, with works at Philadelphia and Jenkintown, Pa., and its subsidiary corporation, the Philadelphia Roll & Machine Co. The relations of the Taylor company and the Wharton company have been so close that a unity of interests has been deemed advisable. The Taylor company will maintain the corporate identity of the Wharton company, and the Roll & Machine company, and on Oct. 1 the Taylor Iron & Steel Co. changed its corporate title to the Taylor-Wharton Iron & Steel Co. The organization of the Taylor Iron & Steel Co. becomes the organization of the Taylor-Wharton Iron & Steel Co., as follows: President, Knox Taylor; vice presidents, A. E. Borie, Prof. H. M. Howe, V. Angerer; secretary and treasurer, W. A. Ingram. The Taylor company and the Wharton company have each had a successful history of more than 50 years. During the past 18 years, the business of each company has been largely supplemental to the other in the manufacture and application of manganese steel. The Taylor company has in recent years devoted itself to the manufacture of steel castings of a special high grade. Of these specialties, Tisco manganese steel is the principal one. Tisco manganese steel castings are particularly applicable for use in railway track parts, safes, vaults, conveyor chain, sprockets, special wheels, wearing parts of rock crushing and cement grinding machinery, centrifugal pumps, wearing parts of steam shovels and dredges and other parts of heavy duty machinery subject to wear, abrasion or shock. The Wharton company manufactures switches, crossings, special rails and track parts for steam and street railways. Its specialty is the application of Tisco manganese steel to these parts. The Taylor-Wharton Iron & Steel Co. has increased its capital stock to $4,000,000, of which $2,000,000 are preferred. There will now be outstanding $750,000 common, $1,500,000 preferred and $1,250,000 of an authorized $2,000,000 bond issue. William Morris Imbrie & Co. have purchased the bonds and will offer them shortly to the public.

Trade Notes

Increasing business has caused the Titanium Alloy Mfg. Co. to remove its general sales department to its works at Niagara Falls, N. Y., where the electric power is obtained. The company has also created a district office at Pittsburgh.

The American Metal Co., 52 Broadway, New York, at present the representative in this country of the French aluminum syndicate, has also been appointed sole selling agent of the Southern Aluminum Co., which is erecting a large plant at Whitney, N. C. The American directors of this company are Carl M. Loeb and Theo. Sternfield.

The Rateau Steam Regenerator Co. has been awarded an order by the Inland Steel Co., Chicago, for a complete equipment of Rateau steam regenerators. The regenerator equipment will handle the exhaust steam from two mill engines at the Indiana Harbor, Ind., plant of the Inland company, and will deliver the steam to two low pressure turbines of 2,000 kilowatts each.

Fires

Serious damage was done by fire to the foundry and machine shops of the Continental Gin Co.'s plant, at Dallas, Tex., recently.

Fire did considerable damage to the warehouse of the Ruston Foundry & Machine Shops, Ruston, La., a few days ago.

Damage estimated at $1,000 was done to the machine shop of R. S. Newbold & Sons Co., Norristown, Pa., recently.